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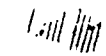

# THE HORSE,

IN

# HEALTH AND DISEASE;

OR, SUGGESTIONS ON

HIS NATURAL AND GENERAL HISTORY,
VARIETIES, CONFORMATION, PACES, ACTION, AGE, SOUNDNESS,
STABLING, CONDITION, TRAINING, AND SHOEING:

WITH A DIGEST OF

## VETERINARY PRACTICE.

NNA 96

BY JAMES W. WINTER,

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TO

CHARLES MILLER ALDRIDGE, ESQ.

M.R.C.S.L.

OF WITHAM, ESSEX,

AS A SLIGHT TESTIMONY OF THE AUTHOR'S ESTEEM

OF HIS UNINTERRUPTED FRIENDSHIP THROUGH MANY CHEQUERED

YEARS,

AND IN ADMIRATION

OF HIS SCIENTIFIC ATTAINMENTS.

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# PREFACE.

A literary production that may tend to the advancement and diffusion of Horse-knowledge cannot be without public utility. The number and value of the Horses of Great Britain are sufficient excuse and apology for such an attempt.

The present work aims at no higher distinction than that of offering a few suggestions on this interesting topic, leaving fuller details to be gathered from the elaborate publications previously issued from the press, or from a far better teacher than either, — practical experience.

The writer has endeavoured to make this treatise a vehicle for introducing to the lover of horses, his own views on some interesting points of equine economy, esteeming it a duty, in accordance with the famous injunction of the chemical philosopher Boyle, to contribute to the general store such facts as presented themselves to him in the exercise of his art.

In the last portion of subject, the author has been led to offer a *précis* of Veterinary Practice, not in order to induce, or enable, the horse-owner to attempt the medical treatment of his own animals, and so dispense with the services of the Veterinarian, for such an object would be nugatory, as well as pernicious to his best interests, unless, at the same time, it were

possible to establish in his mind the elements and principles that direct the healing art. The horse-keeper has no greater enemy, and the Veterinary Surgeon no better friend, than the unskilled dabbler in physic. From it, however, he may glean a knowledge of the causation of disease, and so be armed for its prevention. He will learn that it is easier to prevent than cure; more to his own advantage to ward off the attacks of disease, than to undertake its treatment.

The young practitioner may also collect from the pathological and therapeutical axioms, hints which his own preliminary scientific education will teach him how to apply. Something may be gained by recapitulation; and new combinations, even of old thoughts, are frequently suggestive of considerable improvement.

J. W. W.

Guildford, 8th December, 1845.

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# THE HORSE,

## IN HEALTH AND DISEASE.

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## CHAPTER I.

### NATURAL HISTORY AND ZOOLOGICAL CLASSIFICATION OF THE HORSE AND HIS CONGENERS.

"Thou shalt be for man a source of happiness and wealth, thy back shall be a seat of honour, and thy belly a source of riches: every grain of barley given to thee shall purchase indulgence for the sinner." *The Koran.*

ACCORDING to the ancient Greek Mythos, the beautiful animal forming the subject of this treatise originated in the contention of two deities, emulous to confer on mankind the most valuable boon. Minerva created the olive-tree, when Neptune, to outrival her, gave the horse.* His noble prowess, bold, majestic front, "speed of thought," and graceful symmetry, have alike been the admiration of men of every age, and the theme of poets of all lands. Job, Homer, Virgil, Shakespere, and many others, have successively paid willing tribute of their genius to the elegance of his form, and the lively animation of his spirit. A friend to man, an ornament to the earth. No other animal has contributed so much to the social advancement of the human race. Speed and endurance, strength and

* It is probable that this poetical allegory was primarily intended to convey nothing more than that the olive was the fruit of sagacious cultivation, and the horse first introduced to their islands by some adventurous voyager from the adjacent continent; subsequent poets confirm this view by representing Neptune as striking the earth with his trident, and thereby giving existence to the horse.

elasticity, elegance and power, properties so varied and valuable, are so perfectly combined in this admirable creature, as to proclaim him without parallel through the wide circuit of animated nature.

They who first captured the horse in his native wilds, and constrained him to participate in their own labours, bestowed on posterity an invaluable obligation. Perhaps, of all the victories which man has acquired by the influence of superior intellect over the animate world, his subjugation may be regarded as the most noble and valuable. The appropriation of such great animal power as he possesses to the purposes of labour, pastime, or war, mark at once the diversity of application, and the pre-eminent value of the conquest. He contributes alike to the pomp and splendour of the noble, to the ease and pleasure of the affluent, and to the assistance and profit of the industrious. Chivalry itself owes half its romance, and all its name, to the horse. For a long time mere possession of this animal appears to have reflected on the owner the most distinguished honours. The Hippobatæ*, the Hippobotes†, the Equites, and the Equestrians of Greece and Rome, and the Chevaliers and Cavaliers of later nations, are similarly indebted to the horse for their title and honours.

So warm has been the admiration excited by the horse, so general the esteem of his power and beauty, that it ceases to be surprising that some barbarous nations of antiquity should have invested him with almost supernatural qualities. By others, he was regarded as the noblest sacrifice that could be offered to an offended deity. Such was done by the Assyrian nation, who selected for this sacred purpose the

* From ἵππος, *a horse*, and βαίνω, *to ascend*.

† "When the Athenians attacked and defeated the Chalcideans, they left 4000 colonists in the island to occupy the pasture lands of the Hippobotes (knights or feeders of horses), a name given to the most wealthy of the Chalcideans."—*Mitford's Greece*.

most perfect that could be obtained. It is evident, from the Hebrew Scriptures, that it was also anciently common to consecrate horses to the Sun. Josiah took away those which the kings of Judah, his predecessors, had reserved as an offering to that luminary. (2 Kings, xxiii. 2.) In Persia, and among the Messagetæ, horses were also sacrificed to the Sun, from the impression, as Herodotus alleges, that it was most proper to offer the swiftest of mortal animals to the swiftest of immortal beings.* Xenophon also describes a solemn sacrifice of horses, which was made with high ceremony: they were the finest that could be selected, and were led harnessed to white chariots, crowned, and consecrated to the same luminary. Horses were also sacrificed to Neptune and the deities of rivers, being precipitated into the sea or into the rivers. Sextus Pompeius threw into the sea living horses and oxen in honour of Neptune, whose son he professed himself to be. The sacred horses of Germany were white; they were not employed in any profane uses, and the populace took presage of what was to come from their neighings and actions. †

A glance at the variety and quality of the horse's services will convince us of the inestimable benefit he is to mankind. Setting aside the beauty of his form, and estimating him alone by his utility, comparing his services with those rendered by the other domesticated animals, the balance will be found greatly in

* "Placat equo Persis radiis Hyperione cinctum;
Ne celeri detur victima tarda Deo." *Ovid. Fast.* lib. viii.

† Perhaps the white horse emblazoned on the royal shield of Hanover arose from this circumstance.

After Camillus had besieged and taken the city of Veii, he greatly disgusted the people of Rome by making a triumphal entry with his carriage drawn by four milk-white horses, which, being held sacred, were considered more proper for doing honour to their gods than their generals. The liberation of horses which Julius Cæsar ordered to be made after the passage of the Rubicon, was probably connected in some way with the same superstitious feeling.

his favour. It is only by doing so that we are enabled to estimate correctly his real value, to appreciate properly his exertions, and to award his comparative rank. If he is not found equal to the dog in intelligence and personal attachment, to the elephant in strength, or to the camel in endurance, he certainly takes precedence of them all in general utility, and universality of application. Exclusive of the dog, he is endowed with a constitution capable of withstanding a wider range of thermal alternation than any other domestic animal; the scene of his services extends from the latitude of Tierra-del-Fuego to the borders of the Arctic circle: the numberless purposes to which he is so profitably applied, are enhanced by the rapidity of his movements, the endurance of his powers, and the grace and beauty of his proportions.

Animals less generally useful to man than the horse is, appear to be less widely spread, and incapable of sustaining so well the vicissitudes of climate and variety of soil. Some quadrupeds seem to be restricted solely to countries to which they are often so peculiarly adapted by structure and constitution. Such is the case with the reindeer and the camel.*

* The reindeer, confined as it is to that inhospitable region where the gloom of the long polar night sheds its benumbing influence, is bountifully provided by nature with such striking peculiarities of its economy, that admirably fit it to its indigenous country. The eyes are furnished with a transparent, nictitating membrane, which the animal projects at pleasure over them during the frequent violent snow-storms, and through which it can see sufficiently without exposure of the organ to injury. The hoofs also are so deeply cleft, and expand so widely upon pressure, as to form a broad basis of support, and prevent the animal from sinking into the soft snow. The camel, an animal of a far different clime and conformation, is equally well fitted by nature to the arid and barren sands it is used to traverse. On its long and tedious journeys it is often compelled to fast for a considerable period, sometimes several days together; to enable the animal to support this, nature has most providently made a twofold provision. The hump consists almost entirely of fat, and is known to be a reservoir for the sustenance of the animal when deprived of its usual rations. It is most anxiously examined by the drivers, before commencing

For all purposes in which speed, combined with strength, is a desideratum, the horse is pre-eminently useful: he has superseded the ox in the more improved forms of agriculture, and though some have contested the economy of the substitution, it will be found that two sources of great benefit accompany his employment, viz. the general quickness with which he performs his laborious operations, and the superior excellence of his excrements as a manure to the land upon which he toils.

In some situations circumstances combine to render the horse, without the assistance of art, an unprofitable servant to man. If the country is too rocky, the wear of the horn of the feet is more rapid than its growth, and he is consequently lamed. In such countries, before the invention of soleæ, sandals, or iron

a journey of considerable length, in order to ascertain if the camel has sufficient stock for its nourishment on the desert. During the exertions of the quadruped this projection gradually decreases in magnitude, or "it feeds on the fat of its own hump," as the Bedoween Arabs say. The stomach also is provided with capacious cells for the retention of water, to refresh and invigorate the animal; and travellers, aware of the fact, have sometimes destroyed the camel to get at this supply, and save themselves from dying of thirst. Nor are these the only peculiarities of its structure, for it possesses a most useful apparatus for moistening the back part of the throat, which is not found in any other animal. The elastic pads or sole-cushions which cover the bones of the feet, not only prevent concussion, but retard the conduction of the heat from the burning soil. The nostrils are capable of being closed at the animal's pleasure, so as to exclude the dust or sand; and further, he is provided with large glandular bodies at the back of the head, which secrete and exude a sebacious fluid, tending possibly to preserve the skin of the head and neck in a lithe and healthy state. My attention was first drawn to the existence of these glands by my friend Dr. Abbott of Cairo, and I am not aware that their presence is adverted to by any naturalist who has written on the anatomical structure of this remarkable quadruped. Yet, with all these appropriate, apposite, and valuable peculiarities, these animals are far from being widely spread: the reindeer is confined within a very narrow circuit, and the camel is altogether incapacitated from exerting its powers on any other kind of soil than that of its native country. Fitted, as it so well is, to the plains of Arabia and the surrounding parts, when placed on land wet and slippery it cannot proceed a hundred yards without stumbling, and is altogether useless in mountainous, hilly, or woody countries, and the real scene of its services is contracted beyond what is generally supposed.

shoes, to protect his hoofs from attrition, he was rendered almost a burden. This was the case of old with Judea. The inhabitants were unable to use cavalry in their armies. The ass and mule were substituted for the horse for general purposes; their upright feet were found to withstand the wearing effect of the rocks much better than the horse's. At the same period Egypt and Scythia, Arabia and Persia, abounded with horses; the alluvial soil of the former, and the sandy plains of the latter, were both trodden with comparative ease and safety by the horse. (See Shoeing.)

It is not enough for man to possess and enjoy the gifts of nature, but he must raise speculative discussions respecting their *genesis*, and vainly endeavour, after the lapse of unknown ages, to assign the clime and country to which they are indigenous, and from whence, in many instances, their offspring has been so widely disseminated. With regard to the native country of the horse, opinions are very conflicting; most of them, upon examination, appear to be based on surmises more or less injudicious, and wholly unsustained by sufficient reason or authentic authority. The course of ages which has elapsed since the horse became a habitant of the earth may have served so to alter his primitive symmetry, that even the original type may not at present exist. A propitious climate and generous soil will gradually modify and improve a subordinate breed, while extreme cold, and its attendant stunted vegetation, dwarf and degenerate a superior race. Variety of form, colour, and constitution, result from the long continued action of physical agencies on his frame. The diminutive, shaggy pony of the Shetland and Orkney Isles, and the ponderous Flanders cart horse, are alike familiar examples of the power of the elements to vary his bulk, and the plasticity of his constitution in acclimatising and adapting itself to natural circumstances.

Perhaps the effect produced by diversity of soil and temperature on the shape and size of the animal frame is by no creature more plainly demonstrated than the horse. These universal agents most materially modify his structure, reducing or increasing it beyond the medium, according to the prevalence and degree of their operation. A temperate climate, open, champaign country, moderately supplied with water, appear best adapted to his natural habits and constitution. Extremes, both with regard to the temperature of the atmosphere, and moisture or dryness of the soil, are certainly incompatible with the most perfect developement of his organism. The quality and length of the hair increases with the coldness and moisture of the locality; and those diminutive breeds which inhabit extreme northern countries are provided with a supernumerary covering, of a woolly nature, beneath the ordinary coat, well calculated to ward off the effect of the rigorous character of the climate. In the south the coat is of a cooler texture, thinner, shorter, and glossy. As a general rule, the colours of the horse become lighter as he approaches the tropics. In this he reverses the law prevailing over man, whose skin and hair darken in tint towards the equator. The horses of Arabia are mostly grey, those of the boreal regions commonly black. The size and inclination of the hoof is also changed, and adapted to the nature of the soil; on wet lands the foot assumes a flat and expanded appearance, which effectually prevents the animal from miring in the soil, by the increase of supporting surface which it offers; but, on the contrary, in dry countries, the wall of the foot becomes more contracted in size and upright in direction. Nature has bestowed on this noble animal a constitution capable of withstanding the vicissitudes of a wide range of temperature; and so extensive is his geographical distribution, so numerous his varie-

ties, that it has become impossible to declare with certainty, either his primitive country, or original breed. He has extended himself, apparently, with equal facility, over lands characterised by great diversity of soil and climate; and his numerous varieties or breeds seem to flourish alike in localities to which they have been gradually modelled by the hand of time, through the succession of numberless generations.

The majority of writers on this subject are inclined to regard Arabia as the native land of the horse; and certain it is, that there he flourishes in unequalled perfection. The happy conjunction of speed and spirit, blended with so much docility and endurance, have at once attracted and misled them. Others have founded a reason for claiming Egypt as the original country of the horse, from the circumstance of his being incidentally mentioned in Holy Writ as being there domesticated at an early period; but certainly it appears too shallow a warrant for inferring that he should be indigenous because he was domesticated. Besides, Egypt is physically unadapted to support the horse in a state of nature. Without the directing hand of man, at one season of the year its vegetation would be completely destroyed by the fervid rays of the sun, and at another the annual inundations of the Nile unfit this country from being a natural home of the horse.

Humboldt, Pallas, and some other naturalists are inclined to view the barren steppes of Crim Tartary as his father-land, from the fact of some wild races being found there at the present day. "It is not," says Kohl, in his interesting Travels, "till we reach the heart of Tartary, or the wastes that stretch along the Sea of Aral, that we meet, for the first time, the horse really in a state of nature."

Bones of the horse are found in numerous parts of the old world, buried deeply in depositions which

must have taken place many thousand years ago. Some equine fossil remains have also been lately discovered in America, mixed with those of extinct races of animals; they cannot but be regarded as proof of a prior existence of this quadruped in that continent to the later introduction of it from Europe; though by some mysterious revolution of nature he appeared to have become totally extinct. Remains of the horse have been found in Britain. The celebrated Kirkdale cave, in Yorkshire, contains large quantities of his bones, mixed with those of the elephant, rhinoceros, ox, deer, tiger, hyæna, and other beasts of prey.*

This fact would almost warrant us in placing the horse among the indigenæ of our own country; at least it is satisfactory evidence that he had a very early existence on the land now forming our island. The horse was naturalised in Britain long before the Roman invasion; at that important historical epoch, our savage ancestors were found to have already subdued him to their rude purposes.

In some parts of the world the horse still flourishes in the unrestrained possession of freedom;

> "With flowing tail, and flying mane,
> Wide nostrils—never stretch'd by pain—
> Mouths bloodless to the bit or rein,
> And feet that iron never shod,
> And flanks unscarr'd by spur or rod,
> A thousand horse, the wild, the free,
> Like waves that follow o'er the sea." †

* Professor Buckland, in his Dissertation on these fossil bones, states, that they were fractured in a manner exactly resembling bones which have been so treated by the hyæna in order to extract the marrow from them, and for which purpose that animal is provided with jaws and molar teeth of immense power. As hyænas are well known to plunder graveyards, and prey on the remains of the human subject, the Professor thought it most probable, from the absence of human remains, that this country was not peopled at that remote period. The remains of the other animals found would also render it apparent that there existed, at that time, a great difference in the climate from that which at present belongs to this country.

† Byron's Mazeppa, xvii.

Immense troops are said to roam the wild and inhospitable steppes of Upper Asia *: they have been met with in some of the more northerly provinces of China, and in the unfrequented regions of central Africa †; and but a short time ago, according to Riesbeck, wild horses existed in Hungary, being possibly the last spot in Europe upon which they lingered. "There," said he, "you meet with deserts, in the midst of which, as in those of Tartary, are troops of wild horses. These beasts are small, light, but not handsome."

On the extensive savannahs or prairies of both Americas wander a feral race of horses. From a point in South America they have dispersed themselves over the whole of that portion of the new world, passed the Isthmus of Panama, and are now rapidly extending themselves over the valley of the Mississippi. The ancestors of these self-emancipated troops were originally introduced into South America by the Spaniards, at the time of their conquests in that part of the world. The rapidity with which they have propagated, and the extent of country which they now occupy, demands the attention of the naturalist. According to Azara, horses were first introduced from Europe to the South American continent in the year 1535. Others were taken into Paraguay as early as 1537. Five horses and seven mares were liberated at the abandonment of the city of Buenos Ayres,

* Wild horses of Tibet:—"About thirteen hands high: a bay colour ran along the upper part of the neck, and back and sides were of a fawn or azure colour. Their heads appeared thick and short, but well carried; their bodies round and short; general shape compact, clean; and tail thinly furnished with hair."—*Moorcroft, Asiatic Researches*, vol. xii. p. 438.

Pallas describes the native and wild horse of the country between the Jaïk and the Volga as being of a colour varying from reddish-bay to fawn colour. A filly which was captured, and afterwards proved very docile, was of a size exceeding that of the domesticated horse, and of an Isabella or light bay, with mane and tail black.

† Mungo Park saw some considerable troops near Ludamar.

which, with others that afterwards joined them, have generated the incalculable troops which now exist. They still show evident mark of the fine Spanish race from which they descend. They associate together in considerable bodies in the open parts of the country, and are exposed, in common with other wild herbivorous animals, to all the vicissitudes incident to their state.*

A traveller in Venezuela describes the herds of wild horses there seen as presenting a beautiful spectacle, particularly when alarmed. "Instead of flying as the deer and other timid animals, they gallop round in compact masses of many thousands, apparently for the purpose of reconnoitring the strangers, and frequently advance boldly to within a few yards of the line of march, where they halt to gaze at the troops, snorting, and showing every sign of astonishment and displeasure, especially at the sight of cavalry. These droves are always headed by some fine-looking old bashaws, whose flowing manes and tails plainly show that they

* Humboldt, in his Personal Narrative, describes the struggle which they maintain against the agencies of nature. The "Ass and Horse," says he, "originally natives of the cold and barren plains of Upper Asia, follow man to the New World, return to the savage state, and lead a restless and painful life in the burning climate of the tropics. Pressed alternately by excess of draught and humidity, they sometimes seek a pool, in the midst of a bare and dusty soil, to quench their thirst, and at other times flee from the waters, and the overflowing rivers, as menaced by an enemy that threatens them on all sides. Harassed during the day by gadflies and moschettoes, the horses, mules, and cows find themselves attacked at night by enormous bats, that fasten on their backs, and cause wounds that become dangerous, because they are filled with acaridæ and other hurtful insects. In time of great drought the mules gnaw even the thorny melocactus, or melon thistle, in order to drink its cooling juice, and draw it forth as from a vegetable fountain. During the great inundations these same animals lead an amphibious life, surrounded by crocodiles, water serpents, and manates. Yet, such are the immutable laws of nature, their races are preserved in the struggle with the elements, and amid so many sufferings and dangers. When the waters retire, and the rivers resume again their beds, the savannah is spread over with a fine odoriferous grass; and the animals of old Europe and Upper Asia seem to enjoy, as in their native climate, the renewed vegetation of spring." — Vol. iv. p. 395, *et seq.*

have never been subject to man's control; and in the rear the mares and colts follow." Races which have again resumed the natural state, were lately to be seen in the woody parts of the lowlands of Jamaica and Hayti. The Falkland Islands are stocked with considerable troops of wild horses, the offspring of some left by the French and Spanish colonists in 1764. They are now hunted for their hides, but are supposed to have gradually degenerated from the original stock, and to have lost much of their strength. They have not sufficient speed to be used in the capture of wild cattle with the lazo.*

The horse naturally inhabits broad and extensive plains. He is not an animal calculated for mountainous or wooded districts, and neither is he adapted to follow the course of rivers, as some others nearly allied to him do. His habits are nomadic; left to himself, he would change his location with the seasons. He is found wild only in champaign countries, where alone he can gather sufficient food, and on which his feet will support him without difficulty or pain. Herbivorous animals are generally gregarious or congregatory. The horse does not form an exception to this rule, but flocks to its kind for mutual protection against the carnivorous animals. Sociality is with them the means of preservation. This instinctive feeling is often powerfully shown in the domesticated races, for if we sever an individual from its companions it frequently becomes unthrifty, restless, and evidently unhappy.

Natural historians, in their endeavours to arrange the varying objects of animated nature, class the horse and its congeners in the following manner: —

* "These horses will attack a single person, and their mode of doing so is by forming a circle round him, and prancing upon him; but by means of the musket they may be readily dispersed."—*Weddell's Voyage*, p. 103.

DIVISION, *Vertebrata* (possessing a back bone).
CLASS, *Mammalia* (such as give suck).
TRIBE, *Ungulata* (hoofed).
ORDER, *Pachydermata* (thick-skinned).
FAMILY, *Solipeda* (uncleft-footed).
GENUS, *Equus* (the horse species).

A considerable discrepancy has arisen among naturalists on the classification of this animal, but the above certainly appears the least objectionable that can be formed. The Linnæan system was certainly unsatisfactory. Linné classed the horse with the hippopotamus, to form a genus in Order Belluæ. By Erxleben he is placed between the elephant and the dromedary. Storr was the first to form a distinct order of the equine family; he placed it immediately after that of the Ruminantia, under the appellation of *Solipedes*. Cuvier adopted his arrangement, but subsequently placed this genus among the Pachydermata, which is probably the most judicious classification ascertainable.

Dental formula: — incisors, $\frac{6}{6}$; canine, in the male only, $\frac{1}{1}$ $\frac{1}{1}$; molars, $\frac{6}{6}$ $\frac{6}{6}$, = 40.

With the horse is ranked all those quadrupeds whose generic distinctive is the undivided hoof — the equine genus.

*Equus Caballus*, the horse.
*E. Hemionus*, of Pallas, the dziggtai, Asiatic.
*E. Zebra*, the zebra,
*E. Burchelli*,
*E. Quagga*, the quagga,
} South African.
*E. Asinus*, the ass.

## THE HORSE.

Syn. Ιππος, Greek; *Equus*, Latin; *Pferd*, German; *Paard*, Dutch; *Hest*, Danish; *Häst*, Swedish; *Cheval*, French; *Cavallo*, Italian; *Caballo*, Spanish; *Loschad*,

Russian; *Kon*, Polish; *Sukh*, Turkish; *Hysán*, Syriac; *Hozán*, Arabic; *Al*, Toorkman; *Ma*, Siamese; *Fur* or *Pur*, Bornou; *Soudah*, Begharmi; *Bilsah*, Mandara; *Barree*, Timbuctoo; *Soo*, Mandingo; *As*, Pustoo.*

The horse, by far the noblest of the genus, is easily distinguishable from the rest of the group. His varieties are exceedingly numerous, and differ widely in physical appearance. The effects of climate and other agencies of nature are displayed on his frame. Zimmerman asserted, but without very evident reason, that he arrived at the greatest perfection between the 15th and 55th degrees of northern latitude. The mare is found capable of generating her species as early as the second year of her existence; but it is detrimental to her own form, and the future energy of her offspring, thus prematurely to tax the productive powers of her frame. It would be far more profitable to delay this important function until the fourth or fifth year, when the outline of her form approximates more closely to the adult, and the vital energies of the animal economy become more confirmed. (See that part of this Work which treats of Breeding.) Mares, in common with the females of many other quadrupeds, are subject to a periodical appetency for the male, which in them is termed horsing. The natural season of its first occurrence is from the end of March to July, and so providential is this arrangement, that the foal will be produced at a time when nourishment will be plentiful for its support. As great facility of motion appears to have been designed by nature in the formation of the horse, many physical peculiarities contribute to ensure that end. A bulky, pendulous udder, like that possessed by some of the ruminnatia, would be incompatible

* Dr. Skinner traces the English word *horse* from the Belgic *ros*, or the Tentonic *rosz*. The latter word might have originated the name of *Roszinante*, which Cervantes gave to the renowned steed of Don Quixote.

with that quality. The mamma, therefore, is small, and furnished with only two teats, which supply a milk of a highly nutritious character, and possessing a larger quantity of saccharine matter than any other animal is known to be endowed with.*

The disproportionate length of the foal's † legs, which is so strikingly apparent when compared with those of the adult animal, is thought by some naturalists to be provided by prescient nature to enable the young animal to keep pace with its dam during flight from any menacing danger. Linné attempted to ascertain the future height of the colt, by admeasurement of its legs; but so much is found to depend on the quantity and character of the nutriment with which it is provided during the important period of its growth, that little reliance can be placed on early experiments of this kind. The historian, the warrior, and the horseman, Xenophon, had long ago alluded

* Parmentier submitted the milk of various animals to chemical examination, and he found that the proportion of ingredients contained was in accordance with the following table:—

*Sugar*, mare's, woman's, ass's, goat's, ewe's, cow's.
*Whey*, ass's, mare's, woman's, cow's, goat's, ewe's.
*Cream*, ewe's, woman's, goat's, cow's, ass's, mare's.
*Butter*, ewe's, goat's, cow's, woman's.
*Cheese*, ewe's, goat's, cow's, ass's, woman's, mare's.

He could not make any butter from the cream of woman's, ass's, or mare's milk; and that from the ewe he found always remained soft. From their general properties he divided them into two classes, one abounding in serous and saline parts, which included ass's, mare's, and woman's; the other rich in caseous and butyraceous parts, as the cow's, goat's, and ewe's.

† The word *foal* is applied indiscriminately to the young of both sexes; but as they increase in age they are distinguished from each other by appropriating the term *colt* to the male, and *filly* to the female; and on their reaching the period of adolescence, about the fifth year, the former assumes the title of *stallion*, or *horse*, (*gelding* if castrated,) and the latter that of *mare*. The etymology of the word stallion is traced by Beranger (Horsemanship, i. 171.) to the feudal custom of confining the stallions, kept to cover mares, in safe and enclosed grounds, but more frequently in the stable. They were called *Equi ad stabulum*, by contraction *Stallum*; whence the Italian term *Stallone*, the French *Etalon*, the English *Stallion*, or stalled horse. Others have supposed it originated from the verb *salio*, to leap.

to the same subject in his Treatise on Horsemanship. "I now explain," said he, "how a man may run the least risk of being deceived, when conjecturing the future height of a horse. The young horse which, when foaled, has the shank-bones longest, invariably turns out the largest. For, as time advances, the shank-bones of all quadrupeds increase but little; but that the rest of the body may be symmetrical, it increases in proportion with them."

Puberty commences in both sexes as early as the second year, but all the structures continue to be gradually developed till the end of the fifth year, by which time the changes in the teeth are perfected, and the muscles have acquired a growth and tone which give to the form the distinctives of adolescence. It is during the term which elapses between this period of adult age and that of confirmed virility, that a further progressive change takes place in the animal economy; the powers of the whole frame continue to acquire strength, and although there is no further increase in height, the parietes of the large cavities, and the muscles of voluntary motion, assume a *furnished* and rotund appearance, and render the animal more capable of enduring continued exertion and privation; the vital endurance and resistance being greater than during the period of adolescence. The fire and expression of the head, the spirit, character, and disposition, become also more marked towards the termination of this epoch.

The natural period of decay of the vital powers, senility, and mature death, may be conjectured to be about thirty years; but few horses, from our barbarous system of treatment, attain that term. (See Age.)

The varieties of the horse differ in height and size, more, perhaps, than those of any other animal domesticated or wild. The shelties of northern Scotland, and the pigmy Cingalese ponies, often measure little

more than thirty inches, or seven and a half hands in height. Old Philip Skippon, while travelling in Germany, observed a little horse about two feet ten inches high. A little mare was brought from the East Indies, in 1765, measuring only twenty-seven inches in height; it was well formed, and between four and five years old. Perhaps the smallest on record is one lately brought likewise from the East, standing only six and a half hands. It was presented to her Majesty. Lilliputian breeds of horses exist in the more northern parts of Sweden, in Iceland, and in Corsica. On the other extreme, a breed of coach horses which was cultivated by the desire of George the Fourth, and rendered fashionable through his patronage, together with the heavy horses of Normandy, reach, and often exceed, the height of eighteen hands (six feet). An American giant horse was exhibited a few years since at the Egyptian Hall, Piccadilly, which exceeded nineteen hands; and another, an English horse, was displayed at the cattle-show of 1844—5, standing nineteen and a half hands.

The walk, the trot, and the gallop, are the usual well-known natural paces of the horse; but the fact of some individuals contracting the pace called the amble, without previous tuition, has induced many writers to regard that also as a natural method of progression. (See Paces.)

In England and other northern countries, on the approach of mild weather, the horse, by a natural process analogous to moulting in birds, divests himself of its winter's clothing of long hair, and produces one of a shorter and cooler texture; and again, before the recurrence of cold weather, reassumes his warm and lengthened coat, to protect himself from the inclemency of the approaching season. The autumnal change is not by any means so general as that which

takes place at the commencement of spring. The hair is not so completely changed, only a portion of it being thrown off, and that which remains, with that which springs up, grows long, and is adapted to the temperature of the atmosphere. These alternate changes are not so well marked in countries possessing an equable temperature, nor even are they so plainly seen in horses kept in the warm atmosphere of a close stable all the year round. When the shedding of the coat commences, the bulbs of the old hair become pale, and by the side of each a small black globular body is formed, which is soon developed into the new hair. Thus the matrix of the new hair is not the old pulp, but it is based in another productive follicle. The long hair of the mane, tail, and fetlocks, is not shed at definite periods with that of the body, but is replaced by a slower and more uniform process. The hair of the mane and tail, will, if protected, grow to almost incredible lengths. It was once the custom in Germany to encourage the growth of the hair on those parts, by reeling it up, and the length attained was exceedingly great. "The mane, forelock, and tail," says Xenophon, "are given by the gods for ornament." And again, "When the hairs of the forelock are long, they do not hinder the horse from seeing, but serve to dash away from his eyes whatever gives him pain. It is natural enough to suppose that the gods gave these locks to the horse instead of large ears, which they have given to asses and mules, to protect their eyes from injury."

The property of changing the colour of the hair with the season, possessed by many animals of the Arctic regions, adapting them to the temperature, is also manifested in the horse, though in a much less degree, for it may be seen that, when constantly exposed to the elements, the long winter-coat assumes a much lighter hue than that of its predecessor.

The skin of the horse is endowed with another remarkable and curious property—that of becoming electrically luminous under certain conditions. I believe this fact has not been hitherto noticed. It is somewhat similar to that previously known to belong to the integuments of the cat, but differing slightly in its manner of discharge. This animal electricity appears to be governed, in a great degree, by the condition of the animal and the hygrometrical state of the atmosphere. Upon using a stiff brush or curry-comb, on a dark night in dry weather, a gleam of electrical light will become perceptible, following the instrument, particularly when applied over the back, loins, and sides. The discharge of electricity from the back of a cat is accompanied with a crackling noise—the usual attendant of electrical phenomena, is isolated, or rises from separate points, and most evidently inflicts a painful sensation on the animal: in the horse no such detonation is heard, the discharge is general, from the whole surface in contact with the instrument, and does not appear to be at all painful to him.

The horse, in common with many other animals, is provided with a thin sub-cuticular muscle, covering the shoulders, flanks, and sides, whose use is to corrugate the skin, shake off flies, and dislodge other annoying substances.

The colours of the horse are too well known to require a lengthened description. The proverb says, "A good horse cannot be of a bad colour." Domestication appears to have the effect of multiplying the colours of animals. The prevailing colour of the wild species is the bay; but Foster says, that among the troops he saw in Central Asia, the dun and the greyish-brown colours were most frequent. Bell judges the chestnut to be most common to the Tartarian districts. Sir Francis Head states, that many of

the horses of the Pampas are piebald. The black is rarely found among the Arabians. The leopard-spotted is said to be frequent in China. With us it ranges from milk-white to coal-black. Some persons are inclined to give the preference to the darker colours, from the fact, that among animals generally, the lighter the skin the weaker the energy. Lord Bacon seems to have entertained the same idea, when he asserted white to be the colour of defect. In some respects, white may be regarded as denoting debility. Renewed skin generally produces white hair, and greys become gradually lighter as they advance in years. Horses with white legs are very subject to grease, more particularly if the rest of the body is of a chestnut colour. The most esteemed, as well as the most common colours, are the bay*, grey, brown, black, and chestnut. Some breeds maintain a peculiar and uniform tint. The Flanders horse is usually black; the Suffolk punch chestnut; the Cleveland bred horse is bay; and a variety common to Norway is dun, with black mane and tail. The king of Hanover possesses a breed, which is reserved for state purposes, of a milk-white colour. Many of them are albinos, and have the pupils of the eye red. Some other albino horses are cream-coloured, or as the French more appropriately term them, *café-au-lait* coloured.

The sense of smell is so delicately acute in the horse, that perhaps he is not exceeded in this function by any other animal. The nose is provided with a very extensive surface for the distribution of the olfactory nerve, by the curious foldings of the turbinated bones. It is principally by means of this faculty he is able to distinguish the qualities of the

* The word *bay* may have originated from the ancient French term applied to horses of this colour. Being one they approved of, they used the appellative of *Bayarie loyal*, or Trusty Bayard.

plants upon which he feeds, and to reject such as are of a noxious or poisonous description. Nature, said Linnæus, teaches the brute creation to distinguish, without a preceptor, the useful from the hurtful, while man is left to his own inquiries. On putting the fingers into the nostrils, at the upper and outward part, they pass into blind pouches of considerable dimensions. These curious cavities have nothing to do with smelling, because they are lined with a reflection of common integument, but they may possibly be of use in mechanically distending the external entrance of the nostrils, and thus materially facilitate respiration during violent exertion. They are also brought into use when the animal neighs; and the Hungarian soldiery slit them up to preclude the possibility of being prematurely discovered to the enemy by the exercise of this habit. On the lower part of the nostril, towards the outer edge, may be seen the mouth of a small tube, which conveys the tears from the inner canthus or corner of the eye. It opens on the skin just before it joins the lining membrane of the nose. This little cavity has often been mistaken, by unqualified persons, for an ulcer common in glanderous affections, and the poor animal has frequently fallen a victim to the error.

Their eyes are large in proportion to those of some other quadrupeds, and the pupilar opening is of an oblate elliptical form, with its long axis parallel to the horizon, thus increasing the lateral field of vision. Round the edges of the pupil is a curious fringe of deep plum-coloured eminences, supposed to be serviceable in absorbing the superabundant rays of light which may be transmitted to the eye. The horse's sight is excellent, and although not regarded as a nocturnal animal, he can distinguish objects at night with great facility. There are but few

horsemen who have not benefited by this power when the shades of night have fallen around them.

The ears are comparatively small, but the conch is endowed with extensive motion, so as to catch the sound coming from any quarter. Their hearing is quick; and although blindness is so destructively prevalent among horses, deafness is exceedingly uncommon. During sleep one ear is usually directed forwards, and the other backwards: when on a march in company at night, it has been noticed, "that those in front direct their ears forwards, those in the rear direct them backwards, and those in the centre turn them laterally or across; the whole troop seeming thus to be actuated by one feeling, which watches the general safety." In contests of speed the ears are generally laid backwards, so as to offer no opposition to the rapid progress of the animal. It must be evident that, if the concave surfaces of these organs be presented forwards, they would gather the wind, and slightly impede progression.

The different vocal articulations to which the horse gives utterance, are collectively termed neighing; but some variety of intonation may be discovered in the expression of its passions; as for instance, the cry of joy or recognition differs markedly from that of desire; and anger from playfulness. The females do not neigh so frequently nor with such force as the males. For this reason it is that predatory and warlike tribes prefer mares, as being better adapted, from their silence, for surprises and reconnoitring. Castration is known to have a modulating effect on the voice. M. Herrissant supposed neighing to be produced by the vibration of two small triangular membranes found at the extremities of the glottis. In the ass and mule this structure is wanting, but they are provided with a more singular apparatus. Hollowed out of the thyroid cartilage is a small concavity, over

which is stretched a membrane, similar to the parchment on the head of a drum. When air is forced behind this substance, a very considerable noise is produced, though from the absence of muscularity the vibrations are without modulation, and consequently dissonant.

The intellectual character of the horse is scarcely excelled by that of any other quadruped. His perceptions are remarkably clear, and his memory excellent. Attachment to those who tend him with kindness forms a prominent trait in his character. The feats which he is often taught to perform evince a high intellectual capacity. So extraordinary do these often appear, that they elicit from admiring spectators equal applause with the biped actor. It is stated by Beckmann, that a horse belonging to an Englishman was exhibited in Spain, and attracted so much attention by its sagacity, that it was formally tried, and condemned by the Inquisition to be burnt alive, for the supposed possession of an evil spirit! Travellers in the desert assure us that horses possess the faculty of directing their course to the nearest water when hard pressed for that necessary article. Mr. Cunningham relates, that whenever he had lost himself when rambling in the woods and wilds of Australia, he immediately threw the rein on the animal's neck, confident that he would carry him home by the most direct route.*

Horses swim with the greatest facility, and the distance they have been known to perform in the water exceeds our expectation. A horse that was wrecked off the coast of South America swam seven miles to land, and saved its life.†

There exists some important differences in the

* Two Years in New South Wales, p. 298.

† Darwin's Narrative of the Surveying Voyages of H. M. Ships Adventure and Beagle, vol. iii. p. 168.

animal economy of the equine family and other herbivorous animals, which, as the inferences from them are of some consequence, it is necessary briefly to notice. The horse naturally requires but little sleep, and even that it often takes standing. In a state of nature, when fodder is short, to support itself properly, it is compelled to graze twenty hours out of the twenty-four. Ruminating animals eat with greater rapidity, and lie down to chew the cud. The horse eats no faster than it digests. Digestion in the former is interrupted, in the latter continuous. This explains why the horse possesses no gall-bladder, as it requires no reservoir for that necessary fluid; for, as fast as the bile is secreted by the liver, it is carried to the intestines to perform its important action on the chymous mass. The stomach of the horse is also remarkably small and simple, differing widely from the capacious and complicated structure of the ruminant; but the intestines are long, and the cæcum capable of containing a large quantity of fluid, of which it is considered the receptacle. The mamma of the mare is by no means so pendulous and bulky as that of the cow. The horse's feet, from their compact, undivided nature, are much less liable to injury during fleet exertion than those of the ox. All these circumstances tend to establish the individuality of the horse, and are so many proofs of admirable design for the purposes to which man has applied him; for without these peculiarities he would not be so valuable and superior, as a beast of continued and rapid motion, and would consequently occupy a very inferior station.

Linnæus asserted that the male horse was without the rudimentary mammæ invariably found in the males of other animals; but this naturalist was mistaken, for they may be seen on each side of the sheath, and although of no possible use, still their existence preserves the uniformity of nature's operations.

The horse and zebra possess horny callosities on the inside of the fore-legs, above the knees, and on the hocks of the hind-legs; the ass and quagga have them only on the the fore extremities.

In a state of nature the horse is purely an herbivorous animal, but under the restraint which domestication imposes, his habits become changed, and grain and dry grasses form the principal articles of his diet. Domestication is known to originate many diseases totally unknown in a natural state, but it appears to have the effect of augmenting the muscular power of the animal far beyond its uncultivated extent.

The taboons, or extensive breeding studs of the Russian steppes, offer the horse to our notice in a condition sufficiently bordering on freedom, to allow of our studying some of his natural habits with more correctness than it would be possible for us to do in the artificial condition in which alone we are in the habit of seeing him in Europe. To Mr. Kohl we are indebted for an amusing description of these taboons, which generally consist of a thousand horses. In such a stud, there are commonly from "fifteen to twenty stallions, and four or five hundred brood mares. The stallions, and particularly the older ones, consider themselves the rightful lords of the community. They exercise their authority with very little moderation, and desperate battles are often fought among them, apparently for the mere honour of the championship. In almost every taboon there is one stallion who, by the rule of his hoof, has established a sort of supremacy, to which his comrades tacitly submit. Factions, cabals, and intrigues are not wanting. Sometimes there will be a general coalition against some particular stallion, who, if he get into a quarrel, is immediately set upon by ten or a dozen at once, and has no chance but to run for it. There is seldom a

taboon without two or three of these objects of public animosity, who may be seen with a small troop of mares, grazing apart from the main body of the herd. The most tremendous battles are fought when two taboons happen to meet. The mares and foals on such occasions keep aloof, but their furious lords rush to battle with an impetuosity, of which those who are accustomed to see the horse only in a domesticated state can form but a poor conception. The enraged animals lash their tails and erect their manes like angry lions; their hoofs rattle against each other with such violence, that the noise can be heard at a considerable distance; they fasten on one another with their teeth like tigers; and their screamings and howlings are more like those of the wild beast of the forest, than like any sound ever heard from a tame horse. The victorious party is always sure to carry away a number of captive mares in their triumph. When the taboon is attacked by wolves, an admirable spirit of coalition displays itself among the horses. On the first alarm stallions and mares come charging up to the threatened point, and attack the wolves with an impetuosity that often puts the prowlers to instant flight. Soon, however, if they feel themselves sufficiently numerous, they return, and hover about the taboon till some poor foal straggles a few yards from the main body, when it is seized by the enemy, while the mother, springing to its rescue, is nearly certain to meet the same fate. Then it is that the battle begins in real earnest. The mares form a circle, within which the foals take shelter. We have seen pictures in which the horses are represented in a circle presenting their hind hoofs to the wolves, who thus appear to have a free choice to fight or let it alone. Such pictures are the mere result of imagination, and bear very little resemblance to the reality, for the wolf has, in general, to pay much more dearly for his par-

tiality to horse-flesh. The horses, when they attack wolves, do not turn their tails towards them, but charge upon them in a solid phalanx, tearing them with their teeth, and trampling on them with their feet. The stallions do not fall into the phalanx, but gallop about with streaming tails and erected manes, and seem to act at once as generals, trumpeters, and standard-bearers. When they see a wolf, they rush upon him with reckless fury, mouth to mouth; or if they use their feet as weapons of offence, it is always with the front, and not the hinder hoof, that the attack is made. With one blow the stallion often kills his enemy, or stuns him. If so, he snatches the body up with his teeth, and flings it to the mares, who trample upon it till it becomes hard to say what kind of animal the skin belonged to. If the stallion, however, fail to strike a home blow at the first onset, he is likely to fight a losing battle, for eight or ten hungry wolves fasten on his throat, and never quit him till they have torn him to the ground." These animals are exposed to the most severe privations during the winter season, from a scarcity of provender, when the ground is covered with snow. If the winter lasts beyond the average term, they are reduced to the necessity of eating the thatch from the buildings, and even to gnaw the hair from each others' tails and manes. "From the hardships of an ordinary winter, the horses quickly recover amid the abundance of spring. A profusion of young grass covers the ground as soon as the snow has melted away. The crippled spectres that stalked about a few weeks before, with wasted limbs and drooping heads, are as wild and mischievous at the end of the first month as though they had never experienced the inconvenience of a six months' fast. The stallions have already begun to form their separate factions in the taboon, and the neighing, bounding, prancing, galloping, and fighting, goes on

merrily from the banks of the Danube to the very heart of Mongolia."

## THE DZIGGTAI.

The *Dziggtai* or *Dshikketi* of Pallas; the *Equus Kiang* of Moorcroft; and the *Yo-to-tse* of the Chinese. — This animal is alluded to by Aristotle under the name of *hemionos* (literally, half-ass); who, together with other ancient writers, describes it as being a native of the unfrequented parts of Syria. Ælian asserts, that it was frequently found in India. It was lost sight of by naturalists for a considerable period, till recognised by Messerschmidt as inhabiting some of the plains of Upper Asia. To Pallas, however, we are indebted for almost all that is known respecting it. According to him, it frequents the great Mongolian deserts, the plains that lie between the rivers Onon and Argun, and the great desert of Gobi between China and Thibet. It is said to possess only thirty-four teeth; but this is most probably an error, arising from the inspection of an immature jaw. They troop together in bands of from ten to twenty for company and mutual protection; frequent sunny plains, and places where salt-springs and saline plants abound. They feed in the meadows, but avoid woody and mountainous districts. They are exceedingly shy, cautious, and timid; difficult to be tamed; very swift, and their senses of smell and hearing are exceedingly acute. In size and general appearance this animal resembles the mule, though it is handsomer; the ears and tail are like those of the zebra; the hoofs and body like the ass's; and the legs resemble those of the horse. It differs from these quadrupeds in possessing a very large head, flat at the forehead, and narrowing towards the nose, and

in having a neck more slender and rounded than the other species of the equidæ. It has also a short, upright, soft, greyish mane, and instead of a lock of long hair on the foretop, there is a downy tuft of about two inches long. The voice of this animal is more grave than that of the horse. It is capable of enduring much exertion, having been known to traverse fifty or sixty leagues across the deserts without drinking. It is captured with difficulty, from its strength and activity, yet hunting the dziggtai for the sake of its flesh is a favourite pastime of the Monguls and Tanguts.

## THE ZEBRA.

The *Wilde Paard* or *Dauw* of the Cape Colonists; the *Equus montanus* of Burchell. — Major Harris describes this beautiful animal as being about twelve hands high at the shoulder, and eight feet two inches in extreme length. Shape light and symmetrical, and legs slender. The feet are small and upright; head light and bony; ears and tail asinine; the latter blackish, about sixteen inches long, and tufted at the extremity. Ground colour of the hair white. The whole of the body, neck, head, and legs, covered with narrow black bands, placed wider or closer together; and the upper ones connected with the dorsal line, but not extending over the belly or inside the thighs. Mane erect and bushy, alternately banded white and black. Two transverse black bands on the ears. Brown stripes on the face, terminating in a bay muzzle. The zebra has the horny integumentary appendage both before and behind. The female, like the mare, has but two inguinal mammæ. Their habits are gregarious, and they inhabit the mountainous regions only of the Cape Colony.

### THE EQUUS BURCHELLI.

*Burchell's Zebra;* the *Bonte Quagga* of the Cape Colonists; *Piitzi* of theBechuana and Matabili tribes. — The male measures thirteen and a half hands in height, and eight feet six inches in extreme length. The carcase is circular, and the legs muscular. The crest is arched, and surmounted by a standing mane, five inches high, banded black and white. Ears and tail equine; the latter thirty-five inches long, flowing and white. Muzzle black. The coat is short and glossy. General ground colour of the head, neck, and body, sienna, capriciously banded with black and deep brown transverse stripes, forming various figures, and unconnected with the dorsal line, which widens towards the croup. Belly and legs pure white. The integumentary horny spur on the inside of the knees only. The udder of the female has four mammæ. It inhabits the plains of the interior beyond the Gareep, in immense herds.

### THE QUAGGA.

About the height of Burchell's zebra, but of more robust form. Ears and tail equine, as in the preceding; the former marked with two irregular black bands. Crest very high, surmounted by a standing mane, banded alternately brown and white. Colour of the head, neck, and upper parts of the body reddish brown, irregularly banded, and marked with dark brown stripes, stronger on the head and neck, and gradually becoming fainter, until lost behind the shoulders. Dorsal line broad; belly, legs, and tail, white. Female similar; mammæ four. Still found within the Cape Colony,

inhabiting the open plains south of the Vaal river, in immense troops.*

These South African animals resemble each other so closely, as to appear more as varieties of the same original stock than distinct animals. The difference between them consists principally in a slight modification of their external markings, produced by some accident of locality, food, or climate. Mr. Campbell was the first to make us aware of the migratory habits of the quagga. As the winter approaches they retire from the tropics to the vicinity of the Malaleveen river, which, though farther south, is reported to be warmer than within the tropic of Capricorn, when the sun leaves the southern hemisphere. He saw bands of two or three hundred, all travelling south, when on his return from the vicinity of the tropic, and various Bushmen, as he proceeded south, inquired if the quaggas were coming. Their stay lasts from two to three months, which in that part of Africa is called the Bushman's harvest. The lions, who follow them, are the chief butchers. During the season, the first thing a Bushman does on awaking, is to look to the heavens, to discover vultures hovering at an immense height; under any of them he is sure to find a quagga that has been slain by a lion during the night.

The zebra was in all probability the hippotigris of the Romans. The eloquent Buffon considers the zebra as the best formed of all quadrupeds, and "the most beautifully clad by the hand of nature. To the figure and graces of the horse, it adds the light elegance of the stag, and the black and white with which its body is ornamented, are arranged with such wonderful regularity, that we might almost be disposed

* The account of the three foregoing members of the equine family is adapted from Major Harris's Wild Sports of Southern Africa, p. 342, 343. The Major captured the specimens from which his descriptions are given in their native pastures, and may consequently be regarded as an authority on the subject.

to imagine that rule and compass had been employed in their formation." The zebra is broken to the saddle or collar with great difficulty. The wildness of their nature is almost insurmountable, but there can be little doubt that, if they were treated with gentleness, instead of the general harsh usage too often the lot of fearful and restive animals, a greater number might be rendered useful. Having succeeded in taming two or more, the course to be adopted should be, to breed exclusively from them, and their offspring would, if there is any reality in the transmission of mental habits, be found more tractable and readily broken in.

## THE ASS.

Syn. Ονος, Greek; *Asinus*, Latin; *Ane*, French; *Asinus*, Italian; *Asno*, Spanish and Portugese; *Esel*, German; *Eezel*, Dutch; *Asna*, Swedish; *Asen* and *Esel*, Danish; *Homar*, Arabic; *Aheia*, Abyssinian.

This unfortunate animal does not invariably meet with the same neglect and ill-treatment which falls to its lot at present in this country. Asses were once more highly esteemed in Palestine than horses, for reasons before stated, and people of the first quality there commonly rode on them. Deborah, in her song, describes the great and powerful of Israel by the expression, "Ye that ride on white asses." (Judg. v. 10.) At the present day, a breed of white asses, celebrated for its excellence, is found near Bussorah. This race is cultivated with the greatest attention, and is supposed, by Lieut.-Col. Smith, to be as ancient as the time of the kings of Judah. Jair of Gilead had thirty sons who rode upon as many asses, and commanded in thirty cities. (Judg. x. 4.) Abdon, one of the judges of Israel, had

forty sons and thirty grandsons, who rode on seventy asses. (Judg. xii. 14.) Divines, therefore, must be in error, when they attribute Christ's riding on an ass into Jerusalem to humility, because this animal was at that period, and still continues to be, commonly used by the most influential persons of the Holy Land; in fact, Moses had previously forbidden the use of horses, on account of their being more unfitted to the country than asses. Asses exist in a wild state in many parts of the world, and are frequently hunted for the sake of their hides. In the time of Aristotle they were far from being universally spread; none were found in Thrace, nor even in Gaul. At the present time the ass is a rare animal in the North of Europe. Those of this country appear to have been originally of two distinct breeds, characterised by the difference of their colour — black and mouse colour. In those of the lighter tint there is a longitudinal list of black extending down the course of the spine, and a transverse one crossing it at the withers. In the onager, koulan, or wild ass, these markings are sometimes double. The Spanish ass is considerably larger than that of Britain, often measuring fifteen hands, and is valuable for the generation of mules, conferring on the produce increased size. Those of Egypt and Barbary are esteemed for their docility and general usefulness. In the former country, and in Turkey, incredible numbers of them are kept in and about the towns and cities. The asses of Senegal are very fine. "With difficulty," says Mr. Adamson, speaking of them, "did I know this animal, so different did it appear from those of Europe: the hair was fine, and of a bright mouse colour, and the black list that crosses the back and shoulders had a good effect. These were the asses brought by the Moors

from the interior of the country." * In Sardinia is found a race of asses very little larger than dogs; they seldom exceed two feet in height, and are in all other respects proportionably small. This animal had been introduced at an early period into these islands, but curiously became extinct for several years. Hollingshed informs us, that, in the reign of Elizabeth, "our lande did yeelde no asses;" but we must not suppose that this animal, so useful to the poor man, had not been previously known in England, for there is satisfactory historical evidence to the contrary. As early as the time of Ethelred mention is made of the ass, and again in the reign of Henry III., yet after that we altogether lose sight of him, until his re-introduction on the revival of our intercourse with Spain.

### HYBRIDS OF THE EQUINE FAMILY.

It has been already ascertained that most of the members of the Solipede genus will reciprocally propagate with each other. Mules are produced between the male ass and mare, and the female ass and stallion. These are relatively the most important of the whole group of mules, as well as the most common. Hybrids have been generated between the horse and quagga. Pennant relates (Hist. Quad. i. 14.) that the experiment was tried between a he ass and female zebra. They were kept some time together without success. At last stratagem was resorted to, the ass was painted so as to resemble a zebra, and was immediately admitted to its companion's embraces, and a mule was the product. Several mules of this kind have been bred at the London Zoological Gardens. Cuvier gives

* Voy. Senegal, 212.

us other cases of the production of hybrid animals between the ass and zebra. One occurred at Turin, but the offspring did not survive its birth. Another instance took place in the menagerie of Paris,—from a female zebra and a Spanish ass of the largest size proceeded a very well-formed female mule. This animal proved a little larger than the mother, but as it grew up assumed much the form of the father. It was excessively indocile. The experiment was repeated with a horse. Conception took place, but in the eighth month of gestation the zebra died. On opening the body a male fœtus was found, without hair, but having the head marked with black and white stripes.

Mules generally approximate in appearance, constitution, temper, and habits, more closely to the dam than the sire. The same rule is found to obtain in all crosses in which extremes have been blended.

Nature most cautiously limits the extension of hybrid animals; she seems to regard them as monsters, and forbids the further multiplication of their ambiguous nature. In England, and other temperate and more northern countries, neither can the he mule generate, or the she mule produce; although anatomists have failed to discover any structural impediment to such a consummation. The prolific effect of genial warmth on the animal economy is such, that exceptions have occasionally been noticed in Spain and Italy, and more frequently in the West Indies. *

* "It may be laid down as a general rule, admitting of very few exceptions among quadrupeds, that the hybrid progeny is sterile, and there seems to be no well-authenticated examples of the continuance of the mule race beyond one generation. The principal number of observations and experiments relate to the mixed offspring of the horse and ass; and in this case it is well established that the he-mule can generate, and the she-mule produce. Such cases occur in Spain and Italy, and much more frequently in the West Indies and New Holland; but these mules have never bred in cold climates, seldom in warm regions, and still more rarely in temperate countries. The hybrid offspring of the she-ass

The hybrids between the horse and ass are of two kinds, differing much in their respective value and properties. Those produced by the male ass and the mare, the true mule, partaking more of the nature of the horse, we shall, for the sake of distinction, designate the *horse-mule*. They are by far the more useful, being much larger and stronger than the *ass-mule*, or those begot by the stallion from the female ass.

The MULE, (HORSE-MULE).—Syn. *Mulus*, Latin; *Mulet*, French; *Mula*, Italian; *Mulo*, Spanish; *Mula*, Portuguese; *Maulthier*, German; *Mul-asna*, Swedish.

The product of the male ass and the mare, the most important of all the mules, resembles, as has before been stated, the dam rather than the sire, for though partaking of and combining the physical conformation of both parents, yet the character of the dam predominates. The formation of the head is perhaps the most exceptionable part of the mule, as it is generally of a heavy clumsy figure. The length of the ears is intermediate between that of its parents': it possesses a short mane, and the hair on the tail is scanty. Mules are exceedingly common in Spain, Portugal, Italy, Switzerland, the West Indies, and South America. Being found better adapted than the horse for traversing rocky, hilly, or mountainous districts, they are cultivated in such countries on that account. They are sure-footed and hardy. They approach the horse in height, being often fifteen or sixteen hands

and the stallion, the γιννος of Aristotle, and the hinnus of Pliny, differs from the mule, or the offspring of the ass and mare. In both cases, says Buffon, these animals retain more of the dam than of the sire, not only in magnitude, but in the figure of the body; whereas, in the form of the head, limbs, and tail, they bear a greater resemblance to the sire. The same naturalist infers, from various experiments respecting cross-breeds between the he-goat and ewe, the dog and the wolf, the goldfinch and canary-bird, that the male transmits his sex to the greatest number, and that the preponderance of males over females exceeds that which prevails where the parents are of the same species."—*Lyell's Principles of Geology*, vol. iii. p. 2.

high. They were formerly much used in Palestine; and in Egypt, at the present day, a good mule fetches as much or more than a horse of medium value. Mules were anciently employed to draw the carriages of the Roman ladies. The coaches of the Spanish nobility are usually drawn by mules. These animals are indispensable in crossing the Alps or Pyrenees. Savoy is noted for producing the largest sized mules, and Spain the finest. The manner of conducting the mules in the passage of the Cordillera of the Andes is brought in a lively manner before us by Mr. Darwin, the talented naturalist to the late surveying voyage round the world:—"The madrina (or godmother) is a most important personage. She is an old, steady mare, with a little bell round her neck; and wheresoever she goes, the mules, like good children, follow her. If several large troops are turned into one field to graze, in the morning the muleteer has only to lead the madrinas a little apart, and tinkle their bells; and, although there may be two or three hundred mules together, each immediately knows its own bell, and separates itself from the rest. The affection of these animals for their madrinas saves infinite trouble. It is nearly impossible to lose an old mule; for if detached for several hours by force, she will, by the power of smell, like a dog, track out her companions, or rather the madrina; for, according to the muleteers, she is the chief object of affection. The feeling, however, is not of an individual nature; for I believe I am right in saying, that any animal with a bell will serve as a madrina. In a troop each animal carries, on a level road, a cargo weighing 416 pounds (more than twenty-nine stone); but in a mountainous country, a hundred pounds less. Yet with what delicate slim limbs, without any proportionate bulk of muscle, these animals support so great a burden! The mule always appears to me a most surprising animal. That

a hybrid should possess more reason[?], memory, obstinacy, social affection, and power of muscular endurance, than either of its parents, seems to indicate that art has here outmastered nature."

The Ass-Mule. — Syn. Γιννος, Greek; *Hinnus*, Latin; *Bardeau*, French; *Maul-Esel*, German. The produce of the she ass and the stallion.

It possesses rather a long head, with ears of the same size as those of the horse. Its mane is short, but the tail is well stocked with hair. It looks a thin, flat-sided animal. It is smaller, less useful, and consequently less common, than the true or horse-mule.

# CHAPTER II.

## BREEDING.

### THE LAWS OF PROPAGATION, AND THE PRINCIPAL VARIETIES OF THE HORSE.

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"We inherited this excellent breed from our virtuous ancestors; and on our death they will be inherited by our sons." — *Amru, one of the Seven Arabian Poems suspended in the Temple of Mecca.*

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A SLIGHT investigation of the causes which have concurred to develope the power of the domesticated horse, beyond that previously possessed by his wild progenitor, will prove that none has been more actively conducive to this point than a system of breeding regulated by a correct knowledge of the natural and physical laws which govern his propagation. The mechanical structure conferred by nature on the horse is destined to give him at once strength and fleetness; a combination rarely occurring in the animal world, and greatly enhancing his utility to mankind. But these powers, considerable as they are in an uncultivated state, are found, by a judicious attention to the particulars of his economy, to be capable of great additional extension. For instance, in breeding, a rule obtains among animals, generally, which is particularly applicable to the horse,—that the character and form of the offspring are governed, in a great degree, by those of its parents; so that by bringing together male and female endowed with properties we wish to see transmitted to the foal, we are possessed of considerable power in moulding the produce to our desires. But our views with regard

to the production of an animal applicable to any particular purpose are facilitated by observing the great influence an increased or diminished supply of aliment has over his proportions. By increasing, to a certain extent, the nutritive particles of the food, without augmenting its bulk, so as to combine a greater supply in a less space, we confer capabilities of speed; and, on the contrary, by giving that which possesses bulk and volume with nourishing properties, we gradually add weight and strength to his stature. This is well demonstrated by the powerful effect productiveness of soil has on the proportions of the animal fed on it; we have only to contrast the shelties of the heathy moors of Scotland with the cart horse from the rich fens of Lincolnshire. Thus are varieties of the same race produced by nature, and thus can they be established and perpetuated by man.

The principle, that parents of whatever character produce young greatly analogous to themselves, has been practically acted upon for ages past; but the full power of this fundamental truth was not known until Bakewell taught the agriculturalist the extensive application it was capable of by the unexpected improvements he effected in the breeding of sheep. By acting on the axiom, that like begets like, he first proved the possibility of originating an animal of great value from stock offering generally no such recommendatory qualities. He selected *both* parents with the finest discrimination, and by uniting in their offspring the superiorities they possessed, laid the foundation of a new and improved race. Perhaps there is no country wherein the principle of like producing like is, with regard to horses, at one time so closely adhered to and widely departed from as in England. Those who breed for the turf have been taught, by long experience, the value of the precept, and therefore carefully act upon

it, using the utmost caution in the choice of both sire and dam, so as to combine and render permanent the qualities possessed by each; while, on the other hand, among the general body of agriculturalists, the most reckless disregard is given to all that foregone experience has proved correct, and it is not surprising that they fail in ameliorating their stock, seeing that they neglect the steps necessary to insure it.

"Breeding in and in" is an expression used to specify the habit of propagating animals successively from a race of similar form and closely allied by relationship. Some have regarded this practice as an active cause of degeneracy, as unnatural, and calculated to engender hereditary diseases. But these evils can only spring from the abuse of the custom. If proper care be taken to exclude the weakly or diseased from participating in reproduction, it may be the means of continuing for an unlimited period of time those beauties which make the possessors of them so highly prized. Breeding "in and in," bestowing, as it does, the power of maintaining the excellencies of any breed of stock, and transmitting those excellencies unimpaired to succeeding generations, ought certainly not to be disregarded or too readily abjured. The fine qualities of the native Arabian are supported from age to age by the jealous exclusion of every admixture of foreign or baser blood. The application of like principles to the generation of our useful animals, has respectively produced the swiftness of the race horse, the disposition to fatten in cattle, and the fine-woolled breeds of sheep; and that which has been originated by art may be continued by the same means. By judicious selection of the parents we can give existence to new varieties, and by continuing to breed from such perfected stock we can perpetuate those qualities. The evils which so often arise among mankind from the

union of those too closely allied in blood, may be altogether obviated in brutes by debarring such as are tainted with hereditary disease, or of deficient constitutional stamina, from participating in reproduction.

In contradistinction to the above method resorted to in propagating this useful animal, may be placed the practice of uniting sire and dam differing, more or less, in physical proportion, with the view of attaining a combination or mean of their qualities. This process is aptly denominated "crossing." If directed with judgment and discrimination, it is a frequent source of improvement, but has sometimes been misdirected and abused by the junction of the most extreme varieties, violating the propriety of nature, and consequently generating stock of inferior character. Most of the improvements in our lighter races of horses have arisen from a cross or intermixture with those of Eastern origin. It is to the blood of the Arab and Barb that we trace their present excellence. Blood alone, of its own innate force, without reference to other circumstances, seems to confer on its possessors extraordinary stamina, a power of enduring and resisting fatigue, and a capability of executing feats of muscular exertion, exceeding in a high degree those qualities in less favoured breeds. In the infancy of racing the custom prevailed, and was found exceedingly beneficial, of crossing directly with horses imported from Arabia. Improvement marked every fresh infusion of Eastern blood. The Darley Arabian, the Byerley Turk, the Lister Turk, and numerous others, were brought into this country at great expense, and gave origin to a progeny celebrated in the annals of the turf. But a change soon arose, and these crossings were no longer attended with such marked benefit; and, later still, actually produced degeneration. The custom accordingly fell into disrepute, but was relinquished with reluctance. The

fact was, our own breed of racers, having become so improved from the first cross, and the strict attention paid them through a long period, exceeded in speed the stock from whence they had principally derived it. The character of racing had also undergone a complete revolution, and the same properties were no longer required, without modification in accordance to the change; it was therefore very natural that a further intermixture of Arab blood would fail in producing the same benefit which had previously attended it. Our heavier sorts of horses have not been without improvement from a judicious system of crossing with those of analogous nature from other countries. An instance exists in the benefit which followed an early importation of the Flemish horse. In breeding animals, no matter of what kind, attempts to enlarge a native race, by any plan of crossing, will be found destructive of their energy, if at the same time a proportionate increase in the supply of food be not provided; and such mistaken practices, when generally adopted, have been attended with the most irreparable mischief. For it is a mistake of the most serious nature to attempt an increase of bulk by crossing the indigenous race with others of large breed, without supplying sufficient nourishment to sustain their enlarged proportions. The attempts which have been made in India to increase the size of the native Indian horse by the introduction of stallions from England must eventually fail, for if the animal resulting from the cross is of greater bulk than the soil, climate, and productions will support and tolerate, then must it be at a sacrifice of its energy and constitution. India must not look to England for permanent improvement in her race of horses; the respective nature of the two breeds are too widely separated to unite and form a race calculated to excel and *endure* on her arid plains. If she wishes to in-

crease the stature of her horses, she must provide for that enlargement by augmenting in the same ratio the quantum of food supplied. Arabians or Persians, of the purest breeds, are far more likely to be the means of lasting improvement, from the similarity of "habitus," and close approximation in form and size.

In choosing stock for breeding purposes, the attention must be constantly directed to the object in view, for, so diversified is the application of the horse, and so various the points denoting individual aptness to those uses, as to render it altogether impossible to particularise any standard that could be recommended as best adapted in all cases to the views of the breeder. Neither can it be expected, that in a limited work of this nature we can enter into the details necessary to be attended to respectively in the different breeds. All that can be done here is, to offer a few general hints to the attention of those interested in the subject, whence, it is hoped, some little benefit may accrue.

From observing what takes place in the generation of hybrid animals, we are led to infer that in crosses the female parent more frequently bestows her character, form, and attributes, on the progeny, than the male. This is remarkably the case in the equine mules. Those of which the mare is the dam, exceed considerably in height, beauty, and utility, such as are the produce of the she ass. In breeding from those of nearly similar conformation, the parent, who at the time of the consummation of the generative act possesses the greatest vigour, bestows on the offspring its principal characteristics. A promulgation of this principle ought to lead to a discontinuance of the present practice of allowing a stallion, whose celebrity has rendered him fashionable, to cover mares too frequently, which, by destroying his energy, occa-

sions the distinctives of the female parent to predominate in the offspring. The locomotive organs of the foal will almost invariably accord with those of the dam. This possibly arises from the fact of nature's bestowing on the young animal a power of accompanying its dam during flight, by giving it long and slender legs. The fact has been before alluded to, but it remains to be seen how this influences the future proportions of the colt. As this length of leg is proportioned to that of its mother, it follows that when a cross has been made, and the dam is of larger size than the sire, the colt's legs, corresponding to those of the mother more than to those of the male parent, will confer on it a permanent increase in the length of limb. On the other hand, when the dam is more diminutive than the sire, the length of the foal's legs, being in unison with her's, will be permanently of a shorter description.*

From these statements it follows, that in breeding, if it is desirable to increase the length of leg, without

* "Nature has given to the offspring of many animals (those of the sheep, the cow, and the mare afford familiar examples) the power at an early age to accompany their parents in flight, and the legs of such animals are very nearly of the same length at the birth as when they have attained their perfect growth. When the female parent is large, and the fœtus consequently so, the offspring will be large at its birth in proportion to the bulk it will ultimately attain, and its legs will thence be long comparatively with the depth of the chest and shoulders. When, on the contrary, the female is small, and the fœtus so at the birth, the length of the legs of the young animal will be short comparatively with the depth of the chest and shoulders; and an animal in the latter form will be generally preferable, either for the purposes of labour, or of food to mankind." In further elucidation of this interesting subject, Mr. Knight, the author of the above extract, adds, that he "imported some Norwegian pony mares, with the intention of obtaining cross-bred animals between them and the London dray horse, having satisfied himself that the experiment might be made without danger or injury to the smaller animal. The bodies and shoulders of the cross-bred animals which he obtained are exclusively deep, comparatively with the length of their legs, which remains unchanged, except that the joints, being greatly larger, on account of the greatly increased strength of the legs, and being of the same form, necessarily occupy a little more space. The strength of these animals appears to be very great." — *Knight's Physiological Papers.*

adding materially to the bulk of the frame of the animal generated, we should select a larger female than male; and when the object is to generate a colt of increased bodily bulk with diminished length of the motive agents, a small-sized mare should be put to a more powerful stallion.

In selecting stock for breeding purposes, care should always be taken to exclude such as are tainted with hereditary diseases. Certain diseases of the eye have been frequently observed to be transmitted from parent to offspring. Again, contraction of the feet, and founder, when existing in either of the parents, have re-appeared in the colt. The same applies to ossific deposits, as spavins and ringbones, where it is suspected the predisposition to them was inherited. The diseased habit of roaring is sometimes transmissible from the parent to the produce.

Stock should not be allowed to generate too early in life, before their powers are fully confirmed, nor to continue after their stamina have become impaired by premature or mature age and decrepitude. A colt of two years may sometimes possibly get promising and useful stock; but if a filly breed before she is three years old, the produce is frequently diminutive in proportions and deficient in energy of constitution, speed, or bottom. As a general rule, brood mares ought not to be allowed to commence before the attainment of their fifth year. More valuable horses for general uses, and more good racers for turf purposes, have been thrown by mares advanced in life, than by those of immature age. Brood-mares retain the function of reproduction to a late period. Mr. Pratt's Squint mare produced seventeen foals, the last being Purity, who was not foaled until the mother had acquired the age of twenty-four. Purity proved fully equal to any of her former stock. The Tartar mare bred at the age of twenty-eight years the celebrated horse Mer-

cury, and the next year produced Volunteer, and at thirty-six she threw the dam of Mr. Hutchinson's Oberon. Atlanta also bred Rosalind at an advanced age. In the same manner, some of the most extraordinary stock of former days were the product of stallions advanced in life; Eclipse, Snap, Young Marsk, Bottom's Starling, Blank, Partner, and Match'em, may be instanced as examples. In breeding race horses it is highly essential that the muscular system of the stallion should not be allowed to lapse into a state of weakness from the want of due exercise, for exercise contributes to his health and muscular energy, and if he be deficient in either at the time of copulation, the foal may be reasonably expected to suffer constitutionally in a similar degree. For a like reason it is obviously destructive to the stamina of the foal that the constitution of either of its parents should have suffered from insufficiency of food or other debilitating causes: a fact marking the influence that the vigourousness of the dam's constitution has on that of her offspring is seen in the superiority of the produce, where the mare is only allowed to breed every alternate year, instead of every year. No animal can be well formed that has been at all stinted in the supply of nourishment necessary to its fullest growth and natural demand, from the earliest period of fœtal existence to complete formation of all its parts. On this account, Mr. Cline, in a short essay on the form of animals, reprobates the practice of connecting a diminutive mare with a large-sized horse. He considered it not alone dangerous to the mother at the time of parturition, but calculated to diminish the development of the foal, from the insufficiency of aliment afforded to it during its intra-uterine existence, and subsequently by the inadequate supply of milk.

Connected with the important subject of the

generation of animal life, is a fact well worthy the deepest attention of those interested in the improvement of our breeds of horses. It has not hitherto attracted much attention, and its important effects are comparatively neglected. Past observation has already elicited that which future research and experiment may confirm, and either render applicable to useful purposes, or raise as a warning against the continuation of the practice. It has already been noticed, that if the dam should have been previously impregnated by a horse differing from her somewhat widely in his characteristics, that that pre-conception will so materially influence the economy of the female as to produce a marked and unexpected impression on the form and nature of the future offspring begotten by another male. To elucidate this point, it will only be necessary to state some circumstances which occurred in the stud of the Earl of Morton. He was desirous of obtaining a mule between a male quagga and a mare, and selected for that purpose a mare of nearly pure Arabian blood, and a fine male of the quagga species, which, copulating, in due time produced a female hybrid. Subsequently the same mare was put twice to a fine black Arab stallion, and produced, first a filly, and afterwards a colt. This filly and colt, bearing no distinct relationship to the quagga, yet strongly resembled it. They possessed his peculiar lists or stripes along the back and across the forehead; in the filly the mane was also short, thick, stiff, and upright, like the quagga's; in the colt, the mane was much larger, but so stiff as to arch upwards and hang clear of the sides of the neck; in other respects they were apparently of equine formation. The same mare was again put to the same horse, in the expectation that repeated reproduction, and length of time, would obliterate the peculiar impression; but the farther the removal from any

probable influence, the more distinct were the quagga markings of the produce, and the greater their apparent relationship to that animal. Some paintings by Agasse, illustrating this curious subject, are deposited in the Museum of the Royal College of Surgeons, London. The horse is not singular in this extraordinary matter, for phenomena of similar nature have repeatedly been noticed in swine, dogs, and cats.

Nature has most wisely provided that the birth of the foal should take place at a period of the year most favourable to its well-being, but domestication sometimes so perverts this arrangement as to render the directing assistance of man requisite for the resumption of the original and natural course. Some inconvenience might arise from the foal's falling too soon in the spring in such a changeable climate as prevails in this country. The early growth of the tender offspring would be liable to be checked by the inclemency of the season, and by the want of the requisite quantity of milk, seeing that it can only be supplied when the fodder possesses the necessary succulence. Indifferent or insufficient aliment to the mother invariably produces a thin aqueous milk, scarcely equal to sustain the life of the colt, and uncalculated to confer on him either strength or vigour.* The evil of foaling too late in the year is, that the winter sets in before the delicate frame of the foal has acquired sufficient strength to meet its severities; and the disadvantage is permanently dis-

* In the northern countries of the temperate zone the usual time of the mare's bringing forth is the spring, in natural accordance to the annual fertility of the earth, in order that the young animal may be properly provided for; but, in Egypt, this periodicity of production is somewhat altered, for, instead of the spring being the time of foaling, by a wise exception, it succeeds the reflux of the Nile, when the land, by becoming covered with verdure, is admirably fitted for its support. In that country the foaling season consequently varies from November to April.

played in the deficiencies of its frame and figure. The last week in April or the first in May, is generally recommended as the most proper time in the whole year for the mare to receive the stallion.

Common assertion fixes the period of gestation, or the time intervening between conception and foaling, at eleven months; but whether calendar or lunar months are to be understood is not explained. This discrepancy will appear the more unsatisfactory when it is recollected that eleven calendar months want but two days of twelve lunar ones. No attempt has been made in this country to resolve the question. In France, M. Tessier endeavoured to arrive at some degree of correctness as to the average time of gestation, by registering a large number of mares. He proved that the term of eleven calendar months was often exceeded by several weeks, and sometimes, though less frequently, parturition took place within that period. "In 582 mares, which copulated but once, the shortest period was 287 days, and the longest 419; making the extraordinary difference of 132 days, and of 82 beyond the usual term of eleven months." (*Blaine's Vet. Outlines.*) On another occasion, an account was kept of the duration of pregnancy of 101 mares. Of these

| | | |
|---|---|---|
| 3 | foaled | in 311 days; |
| 1 | „ | in 314 days; |
| 1 | „ | in 325 days; |
| 1 | „ | in 326 days; |
| 1 | „ | in 330 days; |
| 47 | „ | in from 340 to 350 days; |
| 25 | „ | in from 350 to 360 days; |
| 21 | „ | in from 360 to 377 days; |
| 1 | „ | in 394 days. |

Thus the extremes varied 83 days, while the average was about 351 days, or fifty weeks one day each. Some

breeders entertain an opinion that old brood mares carry the foal considerably longer than young ones, but they offer no satisfactory evidence in corroboration of their view.

The signals of approaching parturition are, enlargement of the external parts of generation, and a gummy exudation from the orifices of the teats. Birth generally takes place within twenty-four hours after the appearance of the latter symptom, but the first acts as a warning, by preceding it for several days.

It is but seldom that the mare requires manual assistance at the time of foaling, which generally takes place without difficulty or danger, in the night. The mare, unlike the generality of quadrupeds, foals standing. She rarely produces twins, and when double births do occur, the offspring almost invariably dies. The custom prevails among some breeders of depriving the foal of the first milk that is secreted; they imagine they can improve on nature, and because they see that the commencing secretion of the udder is discoloured, they ignorantly infer it must be unwholesome, whereas the converse is the fact, for it possesses properties which materially contribute to the health and well-being of the young animal. After foaling, the mare and produce should be placed to grass in some well-sheltered paddock.

Moderate work, or at all events exercise, is beneficial to mares in foal. Work should only be dispensed with when there exists a predisposition to abortion; on all other occasions it will be found conducive to the health of both dam and foal, and tend to lessen the danger at birth. It is at all times proper for mares in foal to lie out during the night, or at least in a box of considerable dimensions, as they are by no means so likely to displace the foal as when under the constraint of a narrow stall.

During suckling, hard food decreases the quantity of milk produced, though possibly it gains in quality what it loses in abundance, but a daily feed or two of corn enables the mare to support the double call on her if she be again in foal.

It is customary to take brood mares to the stallion on or about the ninth day after foaling, and, if they then refuse, which is seldom the case, they are offered again during the succeeding week. There is little objection to this proceeding, if the mare be in good condition, and not debilitated by the late process of reproduction. Should she show symptoms of weakness, or the owner be desirous of raising the character of the produce, it is decidedly best to defer allowing her to receive the horse for a year. On comparing the appearance, structure, qualities, and performances of such produce thrown by mares when breeding every year with their own or other mares' colts bred at intervals of alternate years, the advantage is decidedly in favour of the latter. And it is but reasonable to suppose that such should be the case, for when the economy of the dam is taxed at the same time to contribute to the formation of the embryo and to supply the foal by her side with milk, one or the other, or both, will in all probability suffer deterioration. But few of the higher mammals breed and give suck at the same time; most of the females of the human race undergo a suspension of the generative power during the continuance of the act of suckling, and it is wisely ruled that such should be the case, for an uninterrupted repetition of the process of reproduction cannot but have a tendency to undermine the stamina of the parent, and, as like generates like, that debility will be unerringly reflected on the offspring.

The foal should be early accustomed to feed on corn, and about the time of weaning, the quantity of

it may be advantageously increased. Naturally the colt sucks nearly ten months, but when mares breed every year, this time should be abbreviated, and foals that have fallen in April ought to be weaned during the following September. When first separated from their dams, they are usually confined to a paddock, with warm roomy sheds attached, in which there ought to be placed a low rack and manger. Both hay and bruised oats should now be liberally supplied, in proportion to the size and wants of the colts. Carrots have been recommended as good food for colts; they are beneficial as an early food, and may be moderately supplied when the other food given is deficient in succulence, or the bowels of the colt become costive. Oats in the straw will induce them to eat corn when they sometimes refuse it in the thrashed state. Meal, wheat-bran, or almost any farinaceous food may be given them. Colts have repeatedly been reared by hand, substituting the milk of the cow or ass for that of its parent. Mr. Blaine cites the cases of Cade and Milksop, who were so treated, and subsequently proved good racers. The Arabs never allow the foal to remain with the mother more than thirty days after its birth; it is then weaned, and for the space of a hundred days more is not permitted to have any other food than camel's milk; even water is not allowed: a little wheat soaked in water is then given, but camel's milk still continues to form the colt's principal food. Such is the diet for another hundred days, but during the latter part of this period he is permitted to feed occasionally upon scanty grass near the tent, and to drink water. This second space of a hundred days having fully elapsed, barley is given, and the quantity of milk increased. The Nedjd Arabs substitute for corn a paste composed of dates and water. *

* Buckhardt's Notes on the Bedouins and Wahâbys.

Castration is performed by some breeders before the colt is weaned, but the prevailing practice is, to defer this operation until the animal has attained the age of twelve months. (See Castration.) No young horses should be kept constantly in the stable, as it retards their developement, injures their health, and is particularly destructive to their feet.

### BRITISH AND FOREIGN BREEDS OF THE HORSE.

As an appendix to this short notice of the economical regulations which demand the attention of the breeder of horses, it will not be improper to offer a description of the principal British and foreign breeds and varieties of the animal under consideration. For an account of most foreign horses we shall be compelled to resort to the works of travellers, who, having visited the countries whose animals they describe, were able to form an opinion of their merits with a truthfulness governed by the correctness of the judgment.

### DOMESTIC BREEDS AND VARIETIES OF THE HORSE.

The original character of the British horse has become almost obliterated. So numerous have been the importations of animals from abroad, that his true derivation, like that of the people themselves, is completely obscured. Each invading band brought with them, in all probability, horses from their own country. Thus were introduced Roman, Saxon, Danish, Norwegian, and Norman horses, which, mixing with the native breeds and with each other, must have nearly annihilated all trace of the indigenous breeds. Since these invasions, selections have been made from other foreign countries. The Arabian, the Turkish, the Barbary, the Neapolitan, the Andalusian, and the

Flemish horses have been imported, and have produced changes, the salutary effects of which are still apparent.

Perhaps the races of British horses least intermixed with foreign blood of any description, are the shelties of northern Scotland, the hobbies of Ireland, and the foresters and ponies of several parts of England; mostly of diminutive size, their utility and value is contracted, and they form a very unimportant section of the British equidæ. Those of Shetland run from nine to ten hands in height, and are thought large at eleven hands. The smallest are found in the northern isles of Yell and Unst. During the very hard winters they resort to the beach to eat the sea-ware. They are extremely hardy, and live to a great age, frequently to twenty-six, twenty-eight, and thirty years. The black ones are considered the best. Some very small ponies are said to exist in one of the western islands of Scotland, called Terie, belonging to the Duke of Argyle.

Among the most distinct races now existing in the United Kingdoms, or those which have preserved or created peculiarities which distinguish them from the general mass, are the Cleveland bays, the Clydesdale breed, the Suffolk punch, and the Connemara horse, to which Professor Low has lately drawn public attention. It is found alone in the county Galway, Ireland, and is evidently of Spanish origin, still maintained with the utmost purity. Their introduction is traditionally referred to the year 1588, when some ships, part of the Spanish Armada, were wrecked on the western coast. Their height is from twelve to fourteen hands, and their prevailing colour chestnut, — the same as that of the Andalusian race. They are described as hardy, active, and sure-footed in a remarkable degree, and still retaining the peculiar amble of the Spanish jennet.

From the imported races, celebrated either for blood or bone, have sprung varieties, which by judicious management and cultivation now exceed in their particular uses the stock from which they have descended. Our heavy draught horses, the produce of foreign crossing, now excel their progenitors in strength as much as our turf horses exceed in fleetness the native Arabian. England is a new Arabia to the rest of the world, and so high is the present estimation of British horses of all descriptions that numbers continue to be annually exported to the continents of the old and new world. Wherever speed is considered a valuable acquisition, there does the English race horse meet with the highest estimation; of the fleet he is the fleetest,—

"Sprung from the winds, and like the winds in speed."

When racing first became fashionable among the gentry of England, horses were imported from the northern coast of Africa, from Turkey, and from Arabia, in great numbers, with the view of improving the domestic breeds, but whether those procured were of the best character is perhaps doubtful. Still all the excellencies of the present British turf horse may be traced to Eastern blood. James the First purchased an Arabian stallion for 500*l.*, certainly a large sum when the times are considered. Some others were imported during the Commonwealth. On the Restoration, at the commencement of Charles the Second's reign, the Damascus Arabian was brought over, and was followed by the Byerley Turk, who produced some good stock. The Stradling or Lister Turk was introduced in James the Second's time; he became the sire of Brisk, Snake, and many others, celebrated in the early annals of the sport.* Subse-

* Evelyn, in his Memoirs (vol. i. p. 577.), has left us a description of

quently the Darley Arab made his appearance in England; he was sire of the renowned Flying Childers, perhaps the fleetest and best-bottomed horse ever known. He was never beaten, and ran over the Newmarket Beacon Course (four miles, one furlong, 138 yards) in seven minutes and thirty seconds. About the year 1730 the Godolphin Arabian was purchased in Paris, where he is said to have been employed to draw a water cart. From this horse many of our best blood are descended. These introductions proving so beneficial, were succeeded by others in quick succession; but after a time, the same benefit not appearing to follow each importation, the custom fell into desuetude. The British race horse now far exceeds its eastern progenitors in height, power, and speed.

The custom formerly prevailed of running long distances under heavy weights. Though this was

some other horses of Eastern blood that were brought into this country in the year 1684:—"Early this morning I went into St. James's Park to see these Turkish or Asian horses, newly brought over, and now first shewed to his Ma^ty. There were foure, but one of them died at sea, being three weeks coming from Hamborow. They were taken from a Bashaw at the siege of Vienna, at the late famous raising that leaguer. I never beheld so delicate a creature as one of them, of somewhat a bright bay, two white feet, a blaze; such a head, eyes, eares, neck, breast, belly, haunches, legs, pasterns, and feete, in all reguards beautifull and proportion'd to admiration; spirited, proud, nimble, making halt, turning with that swiftnesse, and in so small a compasse, as was admirable. With all this so gentle and tractable as call'd to mind what I remember Busbequises speakes of them, to the reproach of our groomes of Europe, who bring up their horses so churlishly as makes most of them retain their ill habits. They trotted like does, as if they did not feele the ground: 500 ginnies was demanded for the first; 300 for the second; and 200 for the third, w^ch was browne. All of them were choicely shap'd, but the two last not altogether so perfect as the first. It was judg'd by the spectators, among whom was the King, Prince of Denmark, Duke of Yorke, and several of the Court, noble persons skill'd in horses, especially Mons. Faubert and his sonne, (provost masters to y^e Academie, and esteem'd of the best in Europe,) that there were never seene any horses in these parts to be compar'd with them. * * * They were shod with yron made round and closed at the heele, with a hole in the middle about as wide as a shilling. The hoofes most entire."

sometimes carried to a cruel and unwarrantable extreme, the practice was conducive to the developement of the most valuable qualities of the horse. It led to a combination of strength with speed, and was consequently of far greater utility to the public generally than the present system, which is calculated entirely to promote one object—fleetness. Neither was it then customary to run so early in life, before the animal had lost the distinctives of colthood. By the present injudicious racing regulations both the strength and safety of the animal are disregarded, every thing being sacrificed for velocity.

Each different use to which the ingenuity of man has applied the horse, appears to have called forth a peculiar kind or breed adapted to it. Thus, in England, we have generated the race horse by an intermixture of Eastern blood with the best of our own produce; and the hunter has been originated by combining many of the qualities of the turf horse with a certain degree of strength necessary to enable him to support heavier weights, and to continue his exertion for a more extended period. The almost infinite varieties of the hackney, from the cover hack to the shooting pony, have each their peculiar gradation of form adapting them to their respective uses. The same applies to the charger, and the light and heavy troop horse. Again, the light draught horses combine the proportions which give facility of voli-motion, with those which confer a degree of muscular power adapted to the weight they are desired to impel. The farmer's plough horse, though classed with others under the general term of cart horse, differs widely from the ponderous dray horse of the London breweries. They are each bred for distinct uses, and possess advantages peculiar to themselves, fitting them to the different purposes to which they are applied.

## THE ARAB HORSE.

"True riches are a noble and spirited breed of horses." — *Mahomet.*

Arabia has long and justly been celebrated for the beauty and excellence of its race of horses; the climate appears as adapted to maturing the powers of the horse, as the horse is fitted to the roaming and predatory habits of the people. In the conquests of Islamism we can trace the decimation of Arab blood; wherever they went they left an improved and valuable breed of horses. The immediate successors of Mahomet extended their fierce religious conquests along the northern coast of Africa, and crossing the Mediterranean subdued the whole of the Peninsula. To these ambitious inroads are principally due all that superiority which is, or was, found in the horses of Egypt, Barbary, and other African states; and to this cause Spain owes nearly all the excellence of her breeds of horses, which once rendered them so highly prized and eagerly sought by the rest of Europe. To the influence of Arab blood may also be ascribed the superiority of the Toorkmun and Persian horses.

In Arabia the horse meets with the most sedulous care and attention; at the moment of its birth it is not allowed to fall to the ground, but is received by the Bedouins in their arms, and cherished for several hours, washing and stretching its tender limbs. The Arabian horse is small when compared with the English racer, but the symmetry of its limbs is perfect. It is full of fire and spirit, but nevertheless exceedingly tractable and good-tempered. The form and expression of the head is admirable. Its endurance is great, and fleetness considerable. The Arabs are said not to be so nice in the choice of a stallion as the European breeders; for they ascribe the good qualities of the colt rather to the dam than the sire. They keep their horses

in the open air during the whole of the year, never clean them, but are careful to walk them about gently whenever they return from a ride.

"There are three breeds of horses in Syria: the true Arab breed, the Toorkmun, and the Kourdy, which is a mixture of the two former. The Arab horses are mostly small; in height seldom exceeding fourteen hands; but few are ill formed, and they have all certain characteristic beauties, which distinguish their breed from any other. The Bedouins count five noble breeds of horses, descended, as they say, from the five favourite mares of their prophet — *Taueyse*, *Manekeye*, *Koheyl*, *Saklawye*, and *Dujlfe*. These five principal races diverge into infinite ramifications. Every mare particularly swift and handsome, belonging to any one of the five chief races, may give origin to a new breed, the descendants of which are called after her; so that the names of different Arab breeds of the Desert are innumerable. On the birth of a colt of noble breed, it is usual to assemble some witnesses, and to write an account of the colt's distinctive marks, with the names of its sire and dam. The pedigree is often put into a small piece of leather, covered with waxed cloth, and hung round the horse's neck.

"The best pasturing places of Arabia not only produce the greatest number of horses, but likewise the finest and most select race. The best Koheyls of the Khomse are found in Nedjd, on the Euphrates, and in the Syrian deserts; while in the southern parts of Arabia, and particularly in Yemen, no good breed exists but those which have been imported from the north. From all that has come to my knowledge, on the very best authority, I have no hesitation in saying, that the finest race of Arabian blood horses may be found in Syria; and that of all the Syrian districts the most excellent in this respect is the Hauran,

where the horses may be purchased at first cost, and chosen among the camps of the Arabs themselves, who occupy the plains in spring time. The horses bought up at Basra for the Indian market are purchased at second hand from Bedouin dealers, and an Arab will rarely condescend to offer a good horse at a distant market without a certainty of selling it. True blood horses of the Khomse, as I have been credibly informed, seldom find their way to Basra; and most of the horses purchased there for the Indian market belong to the Montefyk Arabs, who are not very solicitous about giving a pure breed. It might perhaps be advisable for the great European powers to have persons, properly qualified, employed in purchasing horses for them in Syria, as the best mode of crossing and ennobling their own studs. Damascus would be the best position for the establishment of such persons. I am induced to suspect that very few true Arabian horses, of the best breeds, and still less any of the first rate among them, have ever been imported into England, although horses of Syria, Barbary, and Egypt, have passed under the name of Arabs." — *Burckhardt's Notes on the Bedouins and Wahábys.*

## HORSES OF PERSIA AND TOORKISTAN.

The Persian horses appear to rank next to the Arab for beauty and spirit. They seldom exceed fourteen or fourteen and a half hands in height, yet certainly, on the whole, are taller than the Arabs. They have fine foreheads, and are well proportioned, light, and sprightly. Though lovely creatures to look on, they are neither so swift as the Arabian, nor so hardy as

the Tartar horse, and the Shah therefore has always a stable of the Arabian blood.*

The Toorkmun horse is described by Sir R. K. Porter as scanty in barrel, with long legs, very often ewe necks, and always large heads; but when crossed with the Persian, produces a most magnificent looking creature, all elegance and elasticity, being of a rather stronger mould than the Nidjd Arab. This statement is confirmed by the lamented Sir Alexander Burnes, who being a good judge of horses, his opinion is valuable. He remarks that "the Toorkmun horse is a large and bony animal, more remarkable for strength and bottom than symmetry and beauty. Its crest is nobly erect, but the length of body detracts from its appearance in the eye of an European; nor is its head so small or its coat so sleek as the brood of Arabia. This want of ornament is amply compensated by its more substantial virtues, and its utility is its beauty. The breed of Toorkmun horse is of the purest kind. When the animal is over-heated, or has performed any great work, nature bursts a vein for it in the neck, which I did not at first credit, till I had become an eye-witness of the fact. The Toorkmuns

* "Media may be deemed the *cradle* of what was afterwards denominated the *Persian power*; for it produced not only a hardy race of men, but also a numerous breed of the finest horses, from whence was formed the best cavalry of Asia; which were, in fact, *Median*, although the superior fortune of Persia communicated its name to *those*, in common with the empire at large. It is well known that the Medes held the sovereignty of Asia, *previous* to the Persians. The horses in question were those bred in the *Nisæan* pastures; and which were so much famed for size, and for beauty and swiftness, in almost every ancient historian and geographer. These pastures are recognised in the beautiful country above the Mount Zagros, between Ghilanee and Kermanshah. *Nisæus* was a district in Media, remarkable for producing horses of an extraordinary size. Xerxes' chariot was drawn by them, and the sacred horses in the procession were Nisæan; Alexander gave a Nisæan horse to Calanus, to carry him to the funeral pile. The King of Parthia sacrificed one to the Sun, when Apollonius of Tyana visited his court. Masistius rode a Nisæan horse at the decisive battle of Platæa."—*Rennell's Geog. of Herodotus*, vol. i. p. 359.

cut their horses; and it is a popular belief among them that they are then more alert, and undergo greater fatigue than stallions. The Toorkmuns believe them to be exceedingly nice in hearing, and will often trust to their steeds for the alarm of an approaching enemy. I was particularly struck with the fine crests of the Toorkmun horses; and I heard, though I could not authenticate its truth by observation, that they are often confined in the stable with no other aperture than a window in the roof, which teaches the animal to look up, and improves his carriage. The contrivance seems fitted to the end. The finer horses of the Toorkmuns are seldom sold, for their owners may be truly said to have as much regard for them as their children. It must not, however, be imagined that all the horses of Toorkistan are equally renowned; for almost every person beyond the Oxus has a mount of some kind: a great portion of them are very inferior animals. In Bokhara there are many Kuzzak horses, a sturdy and little animal, with a shaggy coat and very long mane and tail, much and deservedly admired. They are brought from the deserts between Bokhara and Russia." There is a breed of horses on the Oxus, curious for being invariably marked by dimples in some part of the body.

## HORSES OF TARTARY.

According to an interesting account of Tartary, the horses make but a sorry appearance, being narrow-chested, deficient in buttock, with long necks, inflexible, stilty legs, and no carcass. They are besides of frightful leanness, but, for all this, are exceedingly swift, and almost indefatigable. A little grass or moss contents them.

## HORSES OF AFGHAUNISTAUN.

The Hon. Mountstuart Elphinston, in offering a description of the domestic animals of Afghaunistaun, observes, that the horse claims the first notice. "A considerable number," he continues, "is bred in the Afghaun dominions, and those of Heraut are very fine. I have one or two that had the figure of the Arab, with superior size. A good breed of the Indian kind, called *Tauzee*, is also found in Bunnoo and Damaun, and excellent horses of the same kind are bred between the Hydaspes and Indus; but in general the horses of the Afghaun dominions are not remarkably good, excepting the province of Bulkh, where they are excellent and very numerous. A very strong and useful breed of ponies, called *Yauboos*, is however reared, especially about Baumiaun. They are used to carry baggage, and can bear a great load, but do not stand a long continuance of hard work so well as mules." — *Caubul*, i. p. 189.

## THE PUNJAB HORSE.

"At Puttee we visited one of the royal studs of Runjeet Singh. We found about sixty brood mares, chiefly of the Dunnee breed, from beyond the Hydaspes, where the country is of the same description as Manja, dry and elevated. May not this aridity, as resembling the soil of Arabia, where the horse attains such perfection, have something to do with its excellence? These animals are fed exclusively on barley, and a kind of creeping grass called '*dood*,' which is considered most nutritive." — *Burnes' Travels in Bokhara*, ii. p. 10.

## EAST INDIAN HORSES.

"The breeds of horses indigenous to Bengal are not to be boasted of, whether for temper or other good qualities. They have generally Roman noses, and sharp narrow foreheads, much white in their eyes, ill-shaped ears, square heads, thin necks, narrow chests, shallow girths, lank bellies, cat hams, goose rumps, and switch tails! Some occasionally may be found in every respect well shaped. They are hardy and fleet, but incapable of carrying great weights. Their vice is proverbial; yet, until they arrive at four or five years, they are often very docile and gentle: after that period they for the most part are given to rearing, kicking, biting, and a thousand equally disagreeable habits. The farriers of India commonly confine themselves to the mere shoeing and trimming of horses, leaving the medical branch to a set of quacks, called *salootras*, or horse-doctors, who will be found to be the most formidable competitors with our English practitioners in all the cant and imposition usually attendant on the profession. As to jockeyship, the Asiatic horse-dealer scorns to yield the palm to any of our most experienced black-legs! Not one of them will venture a horse he is about to sell in the stables of the intended purchaser, unless attended by one of his own *syces*, or grooms, who both knows and is known by the animal. If the horse is very old or naturally dull, the syce takes care to ply him with spices and other stimulants; and if vicious, opium and other anodynes are given; so that the horse is absolutely in a state of disguise." — *Williamson's Wild Sports of the East.*

## THE EGYPTIAN HORSE.

The Egyptian horse possesses, as might be expected, a great infusion of Arab blood. To this it owes all

its good qualities; for the fellahs by whom the principal part of the horses of this country is bred, are highly negligent, and quite innocent of any attempt at improvement. This probably arises from their own depressed and enslaved condition, and the insecurity of their property. Few of the Egyptian horses stand above fourteen hands, and the majority of them are considerably under that height. They have neither the beauty of head which is found in the Nedjd Arab or in the English thorough-bred horse, for, although the forehead is as broad, yet the nose is much more elongated, and detracts materially from their beauty. The neck is short and thick. The barrel circular and well ribbed. The croup too often falls away from the horizontal, but the haunches are rotund and muscular. Their fore-legs are placed considerably under the body. and they would be regarded in England as "standing over." This is a formation very general amongst all classes of horses in the East, and is caused by the constant habit of hobbling the fore-legs to the hind ones while in the stable at rest. It offers a good illustration of the power which a custom continued for numberless generations has on the proportions and form of the existing animal. Their legs are exceeding clean, and their feet good and free from contraction. Splints are nearly unknown. Spavins sometimes occur, from the Arab habit of throwing a horse on his haunches for display, which is likewise a frequent cause of abdominal hernia. They are active, enduring, and extremely sure-footed. Few blind horses are seen, which appears rather extraordinary, as blindness is so very frequent among the people. The prevailing colours are the grey and chestnut. Castration is not practised. The most frequent diseases are mange, farcy, and glanders. Many Egyptian horses find their way into this country under the name of Arabs.

## THE NUBIAN HORSE.

"At Halfaia and Gerri begins," says the enterprising Bruce, in his Travels, "that noble race of horses justly celebrated all over the world. They are the breed which was introduced here at the Saracen conquest, and have been preserved unmixed to this day. They seem to be a distinct animal from the Arabian horse such as I have seen in the plains of Arabia Deserta, south of Palmyra and Damascus, where I take the most excellent of the Arabian breed to be, in the tribes of Mowalli and Annecy, which is about latitude 36°; whilst Dongola and the dry country near it seem to be the centre of excellence for this noble animal; so that the bounds within which the horse is in its greatest perfection seems to be between the degrees of latitude 20° and 36°, and between longitude 30° east from the meridian of Greenwich to the banks of the Euphrates. From this extent Fahrenheit's thermometer is never below 50° in the night, or in the day-time below 80°, though it may rise to 120° at noon in the shade, at which point horses are not affected by the heat, but will breed as they do at Halfaia, Gerri, and Dongola, where the thermometer rises to these degrees. These countries, from what has been said, must of course be a dry sandy desert, with little water, producing short, or no grass, but only roots, which are blanched like our celery, being always covered with earth, having no marshes or swamps, fat soapy earth, or mould. I never heard of wild horses in any of these parts. Arabia Deserta, where they are said to be, seems very ill calculated to conceal them, it being flat, without wood or cover: they must therefore be constantly in view; and I never heard any person of veracity say they ever saw wild horses in Arabia. Wild asses I have frequently

seen alive, but never dead, in neck, head, face, and tail very like ours, only their skins are streaked and not spotted. The zebra is found nowhere in Abyssinia, but in the south-west extremity of Knara, among the Shangalla and Guba, in Narea and Caffa, and in the mountains of Dyre and Tegla, and to the southward nearly as far as the Cape. What figure the Nubian breed of horses would make in point of fleetness, is very doubtful, their make being so entirely different from that of the Arabian; but if beautiful and symmetrical parts, great size and strength, the most agile, nervous, and elastic movements, great endurance of fatigue, docility of temper, and seeming great attachment to man beyond any other domestic animal, can promise anything for a stallion, the Nubian is, above all comparison, the most eligible in the world. The horses of Halfaia and Gerri do not arrive at the size of those in Dongola, where few are lower than sixteen hands. They are black and white, but a vast proportion of the former to the latter. I never saw the colour we call grey, that is, dappled, but there are some bright bays, or inclining to sorrel." Vol. vi. pp. 430—432.

### HORSES OF SOUTH AMERICA.

On the wide plains of South America roam innumerable troops of semi-wild horses, descended from the fine Spanish race, whose general characteristics they have not yet altogether lost. Those of the Pampas are described by Miers as a "rather small breed, half blooded, and for short distances very swift, but they are soon fatigued, and consequently not so well adapted to perform the long stages they are obliged to travel. Every proprietor of an estancia has a par-

ticular mark, which is burnt in upon the skin of the animal. It is generally some initial or rude character about six inches long. When any animal changes its owner, the seller puts another of his marks, making it double; this is called the *contrayerro*, and denotes his having no longer claim to the beast. The purchaser then affixes his mark to establish his claim. These markings are necessary in a country without fences, and where it frequently happens that herds belonging to different persons are mixed together." In the mountains of Venezuela "there is a singular-looking breed of horses of very diminutive size; not neatly formed like ponies, but rather resembling cart horses in miniature. They have large shaggy manes, very rough coats, and thick fetlocks, covered with long hair. They are never shod, nor are their hoofs ever pared; so that the horny part projects forwards, in some instances to nearly a foot in length. This gives the animal a most awkward appearance, and suggests the idea of people walking with snow-shoes; yet, notwithstanding this apparent incumbrance, they are very sure-footed little animals, and considered equal to mules on bad rocky roads."

*The Mexican Prairie horse* possesses a fine, delicate head, wide nostrils, slim, tapering, and clean limbs, small and hard hoofs, and an Arabian symmetry of form. They troop together in large numbers, headed by a leader, who, when the whole body are in rapid motion, circles round them at full speed, driving up the laggards in the rear, and then returns to his post in front, with the greatest apparent ease.

## NORTH AMERICAN HORSE.

Within the precincts of the United States the horse has been cultivated with considerable attention. Some

of the most improved breeds of Europe have lately been introduced with marked benefit. In most parts of North America fast trotting horses are esteemed above all others. It is the prevalent and fashionable method of testing the power of their horses; and certainly appears well calculated to establish properties highly useful to the community. The more rapid pace of the gallop is rejected for the more useful one the trot. The most remarkable trotters that have ever appeared in England were brought from the United States; amongst them may be instanced Tom Thumb, Rattler, Rochester, and Confidence. The Americans properly attack our system of turf breeding: they say we go for speed, surpassing speed; and having aimed at this alone for half a century, and still continuing the practice, it will not be surprising if we lose everything else that is valuable.

*The naturalized Canadian horse* is a sturdy, useful, and hardy little animal. They bear hardships and fatigue with astonishing fortitude and resignation. When in a foam of sweat, they are often compelled to wait for hours exposed to all the rigours of a Canadian winter, but without any injury, for they resume their work, ornamented with icicles, but with their wonted willingness and good temper.

### THE SPANISH HORSE.

Spain appears to have been long celebrated for its generous race of horses. From this country the Romans drew large numbers to replenish their cavalry. The soil and climate seem adapted to develope the natural qualities of the horse. The Moorish irruption in the year 710, by introducing Eastern blood, tended further to heighten the esteem in which they had been previously held. Near Aranjuez are established the

royal stables of breeding mares, in which they endeavour to preserve the Spanish horse in all its ancient beauty. The building has for inscription, "Vento gravidas ex prole putaris." The stud consisted formerly of 400 mares and 20 stallions of the choicest selection. Here also were kept 18 stallion-asses and 300 mares for breeding mules, so requisite in the mountainous parts of the country.

## FRENCH HORSES.

Arthur Young, in his Tour through France, observes, that the horses of Limousin are the best of the kingdom. They are used for the saddle. No corn is given them until they are five years old, and they are not worked until they arrive at the sixth year. The Norman horse is a large and powerful animal, used almost exclusively for draught. Considerable amelioration has been effected by the introduction of English and Arab blood amongst the lighter sorts of horses, and the Lancashire and other cart horses among those of a heavier description. The general character of the French horse is a broad chest and round barrel, muscular arms, and angular hocks. In addition, his feet are upright, approaching to those of the mule; and he has pendulous lips on a rather large and bony head. The horses of the Department of Haute-Marne, according to the account given by M. Mariot, are of three distinct breeds, of very inferior description. A great many of the Vadicasse breed of the Basin of the Meuse are sold for the Paris market. Their colour is roan, height from fourteen to fifteen hands, head large, and limbs strong, and covered with hair. These animals are subject to periodical attacks of diabetes and diarrhœa. The Lingone breed are less in size, with large heads and pendent ears, a

good girth, but sloping croup. Their locality is the valley of the Marne, and being inured to a stony and unproductive soil, they are annually purchased, to the number of 3000, for travelling in the mountainous districts. Those of the Barrois race in the vale of the Aube, being too small for draught or agricultural purposes, are also used in the mountains, where they are valued principally for their hardiness, agility, and quietness.

### HANOVERIAN HORSE.

One of the most celebrated breeds of Germany is possessed by the King of Hanover, some of which are milk-white and others cream-coloured. Many of the former are albinoes, having blood-coloured pupils to their eyes. They have generally a showy, muscular, and rotund appearance, possess long manes and tails, and exhibit a deal of knee action. They are used in purposes of state parade, for which they are well adapted. This breed is considered as sacred to royalty, and is cultivated exclusively for the pomp and grandeur of their appearance. Since the accession of the Hanoverian dynasty to the British throne, it has been usual, at different periods, to draft some of these horses into this country, for the purpose of drawing the royal carriages on occasions of great state.

# CHAPTER III.

## CONFORMATION.

## ANIMAL MECHANICS.

"External form is an indication only of the internal structure. The principles of improvement must therefore be founded on a knowledge of the structure and use of internal parts."—*Cline, on the Form of Animals.*

It was the favourite practice of the older writers on the manége to offer to the cavalier unvarying equine maxims, to assist his judgment in the selection of his destrier or war horse. Such of these quaint catalogues of perfection as have been transmitted to us, appear often particularly well adapted to the character and wants of their age, when the qualities sought in the animal were of the most simple kind. But, at the present time, the uses to which the varieties of this animal are applied have become so multiplied, and properties so widely differing in their nature are now required, as to render aphorisms on the subject altogether inapplicable. A description which might apply with force to one of the numerous cultivated varieties of the horse, would be quite useless on attempting to adapt it to another. From the light and elastic form of the race horse, we demand simply *speed;* from the dray horse, *power and weight:* a graduated union of these properties, or the structural conformation giving rise to them, constitutes, respectively, the hunter, the hack, and the coach horse.

The Romans were excellent judges of the "points" or indications of qualities necessary to be attended to in the choice of a horse. Such of their directions

as have descended to us fully evince the deep interest they took in the subject. They prognosticated favourably of a colt, who, when running in the pastures, showed ambition to outstrip his companions. Varro has left us the following detail of qualities desirable in the war-horse:—"His *head* should be small; his *limbs* clean and compact; his *eyes* bright and sparkling; his *nostrils* open and large; his *ears* placed near each other; his *mane* strong and full; his *shoulders* flat and sloping backwards; his *barrel* round, compact, and rather small; his *loins* broad and strong; his *tail* full and bushy; his *legs* straight and even; his *knees* round and well knit; his *hoofs* hard and tough; and his *veins* large and swelling boldly throughout his body."

The Arabian poet Amri Okaïs, a contemporary of Mahomet, thus expresses his idea of equine perfection:—"He has loins of the gazelle, and the limbs of an ostrich. He trots as the wolf, and gallops like a young fox; his haunches are large and robust. The tufted tail trails almost to the earth, and fills up all the space between the hinder limbs, without inclining more to one side than the other."

The horseman need not seek for anything more concise, nor expect to find a more correct and forcible description of the traits demonstrative of desirable properties, than Shakspere's well-known lines:—

> "Round-hoof'd, short-jointed, fetlocks shag and long,
> Broad breast, full eyes, small head, and nostril wide;
> High crest, short ears, straight legs and passing strong,
> Thin mane, thick tail, broad buttock, tender hide.
> Look, what a horse should have he did not lack,
> Save a proud rider on so proud a back."

The animo-mechanical construction of the horse is replete with the beauty of natural design. Certainly no animal is better fitted than it to the purposes to which it is applied. In the bare skeleton there is

much to admire. The parts appear so well adapted for their separate uses, that we have only to know that they exist, and be satisfied that they are not only necessary, but of such paramount importance that no other possible mechanical arrangement would so well perform their office. Yet, however striking the adaptation of the various parts of the body considered separately, they each contribute towards the ultimate object desired, and form an assemblage of mechanical wonders, admirably subservient to unity of purpose and design.

He possesses many beauties of formation in common with other animals which approximate to him in size and figure, but stands alone in the intelligent expression of his head, the simplicity and compactness of his digestive organs, the great leverage of his hock, and the wonderful mechanism displayed in the construction of his hoof.

*Bone.*—The bones are the passive agents of locomotion; they are the levers upon which the muscles act. They support the body, and give protection to the softer parts. Projections from the surfaces of the bones offer advantageous points for the attachment of muscles. As these projections act with lever power, they cannot be too long, for length of leverage mechanically diminishes the required intensity of muscular force. This is particularly applicable to the spinous and transverse processes of the vertebræ, the point of the ulna or elbow, and the os calcis of the hock. The hollowness of bones increases their strength without adding to their weight, as was first satisfactorily explained by Galileo, who proved "that two hollow columns of the same quantity of matter, of the same weight and length, bear to each other a proportion of strength measured by the diameter of their internal excavations." Largeness of bone is not an invariable criterion of strength, as the density may often con-

siderably differ. The slender bone of the blood horse is so much closer in grain, and denser in material, that it comparatively outweighs the large porous bone of a badly-bred cart-horse. Joints, being made up of the articulating surfaces of bones, become the means of extensive motion, often performed under considerable pressure. In order that flexure may be as unimpeded as possible, and to obviate the occurrence of disease from the friction which might ensue, it is important that the bones at the joints should form considerable expansions, so as to divide the weight as much as possible, and distribute it over a more extensive surface.

It is an established law in mechanics, that a simple joint cannot possess great strength, and yet admit of considerable motion. In animals, when these two objects are aimed at, the joint is generally a compound one, or a series of joints. This is the case in the arch of the human foot; strength is there bestowed by the peculiar arrangement of the bones, enabling them to bear easily the whole weight of the body, and elasticity is yet maintained by the play between each separate joint. In the same manner, the hock and the knee of the horse, being each composed of a series of joints, accomplishes the same double object. In the former, the motion is restricted to two bones, whilst the others are principally employed in receiving the superincumbent weight of the body and the propelling lever pressure of the *os calcis*, and imparting a slight spring in order to ward off concussive effects. The motion of each individual joint is insignificant, but when the effect of a series is combined, the quantity provided is sufficient, and the strength of the part is still preserved.

*Muscle.*—The condition of the muscles—the actual moving powers of the animal machine, offers many indications of the horse's real energy. They are the appro-

priate organs of motion, distinguished from the other tissues of the body by their peculiar texture, and their *vis vitalis* or vital contractility. Muscles are made up of fibres, arranged in bundles, or fasciculi, proportionate in quantity to the required action. The effect of their contraction is sometimes conveyed to distant parts by rope-like tendons by which they are terminated. As strong muscles are provided with strong tendons, we may regard the relative size of the tendons as indicative of muscular strength. The muscles perform many different functions in the animal economy, but the most important for our consideration is the result of their contractions on the bones of locomotion. The immediate effect of the contraction of a muscle is a drawing together of its points of attachment, increasing in its diameter, but decreasing in length. Therefore, in proportion to the length of the muscular fibres, will be their efficient contractile power. In all cases where speed is required long muscles are absolutely necessary, providing for the complete flexion and extension of the limbs, and giving the greatest possible scope to the stride; but in order that this extensive contraction should be continued with ease, a due proportion of vital tonicity of the muscular fibre is independently requisite. No animal can be strong unless the muscles are well developed, and of considerable bulk. Power is found to depend on quantity of the contractile fibre. Exercise developes the muscular system, enlarging the outline of the limbs, and increasing the facility and force of the contraction. Tonicity of the muscular fibre, constituting the principal element of *condition*, is judged of by the firmness of the muscles under the hand, by the absence of unnecessary tissue between the bundles, and between themselves and the skin, giving rise to a prominent, distinct, clean, and well-marked appearance of each muscle beneath the integuments.

A physiological fact, to which sufficient attention has not been paid, is attached to muscular action. It is rendered rather remarkable by its being opposed to what might have been deduced from reflection alone on the subject. It might naturally have been expected, that if a known quantity of muscular tissue could produce a certain action in a given time, an augmentation of muscular fibre would effect a proportionate increase in the rapidity of the contraction,—that the time would be shortened; but the converse is the fact, for the smaller the muscles the more rapid the contraction; or, as the quantity of muscular fasciculi diminishes, the time occupied in the production of their utmost contraction also decreases. This principle is completely distinct from that of muscular power, and must not be confounded with it. Illustrations of it are found in the muscles closing the eyelids, which act with proverbial quickness; in the rapidity with which the lizard darts on its prey, the fly, so that the eye fails to mark its instantaneous movements, and perceives only the effect; and in the delicate muscles which ply the wings of small birds and insects, whose swiftness of contraction is incalculable; in fine, all small muscles, though of inconsiderable power, possess this property of vivid action. This explains why diminutive animals are able to keep pace with, or often outstrip, larger ones; why ponies and small animals are generally more noted for their comparative quickness than those of larger size and greater power; and why good trotters are almost invariably undersized horses.

*The Head.*—No part of the animal more plainly illustrates the superiority of breed or blood than the head. The slightest cross becomes evident in its contour. It forms a ready and palpable distinctive of equine aristocracy, and offers us an invariable test of the spirit and temper. As the horse was intended to move on occasion with fleetness, a certain length of

leg was necessarily requisite to the fulfilment of that design. Yet it was at the same time imperative that the animal should be able to gather his food from the surface of the ground. The length of the leg had therefore to be counteracted by a corresponding elongation of the head and neck. In the construction of the horse's head, nature had to fulfil opposite and contradictory objects. A considerable length was necessary to enable it, in conjunction with the neck, to reach the ground; and surface for the attachment of the large and powerful muscles of mastication must also be provided; yet withal as lightly constructed as possible on account of its being situated so unfavourably, at the terminus of a lever. However, it was better that the head should be elongated than the neck; for a heavy weight on a short lever does not act with the same force as a lighter weight would do with a longer purchase. The head is constructed with the greatest possible regard for its lightness. It is divested of all unnecessary covering of flesh. The bones are comparatively bare. In some parts they form considerable cavities for the admittance of air between their inner and outer plates, in order to add to the general lightness. Still the head must be regarded as a great weight in an unfavourable position, and most effective steps are taken to obviate an undue exertion of the muscles of the neck in its support. From the spinous processes of the vertebræ, particularly those of the cervical and dorsal, arises a ligament (*ligamentum colli*), proceeding directly to the upper and back part of the skull, to which it becomes firmly attached. This ligamentous substance is distinguished from most other ligaments of the body by being highly elastic; it allows of considerable extension, accommodating itself to the motions of the head, yet by its contractile power constituting its chief support.

The head should articulate with the neck in a free and graceful manner; and the bones of the lower jaw should be sufficiently divided to admit of flexure towards the throat without interruption to respiration. A line drawn from the foretop to the muzzle cannot be too straight. Should the profile outline curve outwards, it denotes sluggishness; a horse with such a formed head would, in all probability, be unfit for the saddle. On the contrary, if the bones of the nose curve inwards, they impede respiration by diminishing the free passage of the air. For this reason we cannot agree with Mr. Darvill, that "from the lower part of the forehead down to a certain portion of the nostrils, there should be, for a small space or length, a gradual curve or slight concavity." This may add something to the beauty of the head, but cannot certainly facilitate respiration. That portion of the head from the eyes upwards includes the cranial cavity or skull, enclosing the sensorium; and that from the eyes downwards, the face; a certain definite proportion exists between these two parts, which together constitute a well-formed head; but if the facial bones, or those occupying the lower division, exceed their natural size, it is found that those of the cranium are diminished, and the effect is, that the animal invariably proves obstinate, stupid, and heavy.

*Ears.*—The ears are a good index to the temper of the horse. They act as a sort of telegraph of his will. They give us warning of his intentions, and by so doing often enable us, when they are malevolent, to prevent their execution. Horsemen generally prefer them rather small than large, and situated not too far asunder. They should be lively in motion, and, above all, erect. They give animation and expression to the head, and plainly indicate the animal's vigour and endurance.

*Eyes.*—As blindness is so exceedingly prevalent

among horses, it is necessary to be rather careful in the examination of the eyes. The principal diseases attacking the eye of the horse are ophthalmia and cataract. The first is characterised by the appearance of a film on the anterior parts of the eye; the last, by an opacity of the deeper-seated portions of it. The eyes should be full, clear, dark-coloured, and nearly circular. If the eyeball is sunk into the orbit, producing a corrugated appearance of the lids, we may suspect latent disease. If a horse shies, we should be doubly careful in our examination of these organs, as this habit often arises from defective vision. Some horses, usually with a considerable quantity of white about the face, have what is termed wall-eyes. In these cases the iris is found to be deficient in its natural colour, giving a white appearance to it. They are not known to be more liable to affections of the eye than those in which this peculiar defect is absent, but certainly it does not increase the beauty of the animal.

*The Lips.*— The lips of the horse are eminently prehensile. They collect his food and direct its course to the teeth. As an evidence of breeding they cannot be too thin; as an evidence of vigour they should be kept firmly compressed against the teeth and gums. If they hang in a pendulous, relaxed state, they offer a certain criterion of deficiency of muscular enegy. So true is this, that when horses become distressed or fatigued from fasting or hard work, the lips are relaxed, but immediately resume their natural position after rest and food; often forming a useful test of the honesty of ostlers.

*Neck and Crest.*—In all animals intended for rapid progression, it is most advantageous that the neck should be lightly constructed and of moderate length. The upper part, the crest, from which the mane springs, should in these cases also be thin, extending

from the head to the withers in nearly a straight line. When this part is curved, the neck assumes a loaded character, incompatible with speed on the turf. In the lower portion of the neck the thickness may increase, in order to facilitate respiration. Some horses are seen on the race-course and elsewhere in which the neck immediately in front of the withers seems tied down, giving it an inverted or upside-down appearance. The name of ewe or deer-neck has been applied to this formation, from a supposed similarity of construction. This particular shape, rather unpleasing to the eye, is not, however, found to diminish the capabilities of fleetness; some turfites even preferring it to the more natural form.

The crest of stallions, particularly those of the heaviest description of draught horses, frequently becomes exceedingly high, arched, and loaded. In them this formation may be tolerated on account of the usefulness of a few extra pounds on the fore part of the animal, when thrown into the scale against the weight they are employed to put in motion. It has a tendency also to balance the animal during his intercourse with the other sex. On the future size of this part we possess, in males, a great control. By postponing the operation of castration, or performing it prematurely, we can increase or retard to a certain limit its growth and developement. The command thus attained over the symmetry of this portion of the frame is often most serviceably employed in adjusting the proportions of the animal to our will.

*The Fore-Hand.* — The fore extremities are so placed by nature as to bear a large proportion of the superincumbent weight of the frame. In addition to one-half of the body, they have to carry the whole burden of the head and neck, thus imposing on them a considerable degree more weight

than is thrown on the hind-legs. Their province is apparently not to propel, but to support and direct. And in order that they may do this with the greatest possible ease, and at the same time obviate concussion, they are attached to the trunk by muscles, and not by direct bony articulation, as is the case with the hind extremities. The fact of so much weight being thrown on and supported by muscles alone, might lead some to infer that this part of the body was overtaxed, and would be liable to injury from that cause. It is not, however, the case. Many provisions are made to obviate a destructive force being applied to these apparently weak organs. For this purpose the greatest possible care appears to have been bestowed on the mechanical construction of the limb. Among the most efficient is the oblique direction taken by the humerus, the bone connecting the scapula or blade-bone to the arm. Lying, as it does, transversely across the line of pressure, it interposes, like a double spring, its elastic play before any force reaches the muscular attachments.

The comparative weight or substance of the fore-hand is a point of some importance. In the racer, without detriment to its muscularity, it is necessary that it be light, unloaded, and as exempt as possible from everything not absolutely requisite to its own free motion. The same applies with nearly equal force to the hunter, the hack, and lighter description of carriage and draught horse. When, however, the animal is employed to propel considerable weights, an increase in the bulk of the fore parts of the frame is a desideratum; and in that class intended for the heaviest draught work it cannot well be too heavy. In these instances a loaded shoulder and thick neck are not only tolerated, but found of the highest utility. The service derived from extra weight of the fore-hand, in horses used solely for the draught of heavy burdens, may

be thus illustrated. Suppose a horse endeavouring to make his way up hill overloaded, or as nearly as possible balanced by his load. He uses all his muscular force in vain. He cannot advance; and it is uncertain which will obtain the mastery, — he, or the load. This is immediately decided, by placing a boy or other weight across his shoulders. He is then enabled, almost magically, to proceed with facility, overcoming his load by means of a few extra pounds on the fore part of the body.

With regard to the length of the fore extremities, it may be resolved into a maxim, governed by mechanical laws, that the muscular portion of the leg cannot be too great, nor that of the tendinous too short. The first are the active motive agents, while the latter, together with the bones to which they are connected, are the passive instruments of voli-motion.

*The Shoulder.* — Two bones (*scapula and humerus*) enter into the composition of the shoulder, which are mostly enveloped in powerful muscles. A certain proportion of muscularity is necessary to the possession of any considerable degree of power, or to the continuance of high exertion. Yet, for these purposes we must avoid any thing approaching to a loaded appearance. In horses intended for the turf or the saddle, the muscles should gradually increase in distinctness from the neck backwards, so that the shoulder does not start abruptly from the neck, but almost imperceptibly so, leaving it difficult to distinguish the exact part where the one terminates and the other commences.

On the direction taken by the scapula, or blade-bone, considerable importance is deservedly attached. It is found desirable that this bone should be obliquely directed backward, so that the lower end meets the humerus in a slanting direction. A formation of this sort not only obviates concussion, but increases the

effective power of the muscles. Bones placed in a straight line to each other act at a great mechanical disadvantage. The muscles, in order to overcome the effect of mal-position, expend a quantity of their contractile force. When, however, the bones meet each other obliquely, this extra exertion is unnecessary. The parts are already partially flexed, and can act with concentrated effect. The limb is elevated more easily, the action is increased, and all its motions are greatly facilitated. Mr. Youatt remarks, that "the power of the muscles is more than doubled by being exerted in a line approaching so much nearer to the perpendicular." The same talented and popular writer directs our attention most judiciously to another advantage arising from obliquity of the shoulder. "The point of the shoulder is projected forward, and therefore the pillars which support the fore part of the horse are likewise placed proportionably forward, and they have less weight to carry, and are exposed to less concussion, and especially to concussion in rapid action. The horse is also much safer; for having less weight lying before the pillars of support, he is not so likely to have the centre of gravity thrown before and beyond them by an accidental trip; or, in other words, he is not so likely to fall; and he rides more pleasantly, for there is less weight bearing on the hand of the rider, and annoying and tiring him. It likewise happens, unfortunately, that nature, as it were to supply the deficiency of action and of power in an upright shoulder, has accumulated on it more muscle, and therefore the upright shoulder is proverbially thick and cloddy; and the muscles of the breast, which are designed to strengthen the attachments of the shoulders to the chest, and to bind them together, must, when the point of the shoulder lies backwards, and under the horse, be proportionably thickened and strengthened, and the horse is thus still

more heavy before, more unpleasant, and more unsafe to ride."—*The Horse*, p. 231-2.

*The Arm and Elbow.*—The arm of the horse corresponds comparatively with the fore arm of the human being. It differs from it in construction by the two bones (*radius* and *ulna*) being consolidated into one when the animal is maturely formed, whereas in man they always remain separate. The upright bone, the radius, bears the superincumbent weight, and the ulna, which projects posteriorly to form the elbow, gives attachment to muscles, advantageous in proportion to the degree of its projection. The use of the elbow-joint is confined to flexion and extension.

Some horses turn their toes slightly inwards, which inclination, being continued up the leg, tends to throw out the point of the elbow. No evil consequences ensue: on the contrary, it bestows a safe and facile action; but it often happens that badly-shaped horses turn their toes outwards, when the elbow, influenced by the direction given to the bones of the leg, is thrust forcibly against the sides of the chest, materially interrupting the progression, and destroying the safety of the animal.

It is important that the arm should be muscular, and, whenever speed is required, of considerable length.

*The Knee.*—Anatomically the knee is a complicated treble series of joints, most admirably adapted to the purposes designed. It corresponds to the wrist in man. Whenever great rapidity of action is required, the knee should be formed rather longer than usual, showing well as a joint, broad and flat in front, but thin when viewed laterally. This formation will confer capabilities of quick flexion. On examining the back part of the knee, a bone is found projecting considerably; it bears, however, none of the weight of the body, but is of great importance to the animal in bending the limb. Into this bone some of the flexor

muscles are inserted, while the tendons of others pass immediately under it. To give the fullest efficiency to the action of the former it should stand well out from the knee, otherwise it originates an appearance designated among horsemen "tied in at the knee."

*The Fore Leg.*—The fore leg is composed of the cannon or shank-bone in front, and two small splint-bones (*lesser metacarpal*) behind. The cannon-bone receives the major portion of the weight, and communicates it to the long pastern-bone below, but a minor part of the burden is transmitted from the knee to the heads of the splint-bones, which, being attached by elastic ligaments to the cannon-bone, immediately descend, and so lessen the concussive force. Sir Charles Bell has some doubts of this being the function of these bones, and ingeniously suggests that they are useful in extending the leg when it is flexed. His original views as to the uses of these little bones are correct, but he is at fault in arguing that they possess no other useful mechanical property. There is nothing contradictory in the assumption of their performing more than one office. On the contrary, the function exercised in both cases is very similar, alike originating in the extensive elasticity assigned to them; in the one case descending, to prevent a concussive shock, in the other ascending, to facilitate the extension of the leg. In order that we may not be liable to the charge of putting a wrong construction on his expressions, we give the text illustrating the discovery in his own words. He hesitates "in admitting the correctness of the opinion of veterinary surgeons on this curious piece of mechanism. They imagine that these movable splint-bones, by playing up and down as the foot is alternately raised and pressed to the ground, bestow elasticity and prevent concussion. The fact certainly is, that by over-exertion this part becomes inflamed, and the extremities

preternaturally joined by bone to the greater metacarpal or cannon bone, and this, which is called a splint, is the cause of lameness.

"I suspect, rather, that in the perfect state of the joint, these lesser metacarpal bones act as a spring to throw out the foot, when it is raised and the knee-joint bent. If we admit that it is the quickness in the extension of this joint on which the rate of motion must principally depend, it will not escape observation, that, in the bent position of the knee, the extensor tendons have very little power, from their running so very near the centre of motion in the joint; and that in fact they require some additional means to aid the extension of the leg. * * * *

"I do not therefore conceive that this bone can add to the elasticity of the foot. But when we perceive that the head of the splint-bone is behind the centre of motion in the joint, it is obvious that it must be more pressed upon in the bent condition of the joint, when the foot is elevated; and that the bone must descend. If the splint-bone be depressed when the limb is raised and bent, and have a power of recoiling (which it certainly has), it must aid in throwing out the leg into the straight position, and assist the extensor muscles of the knee. Further, we can readily believe, that when the elasticity of these splint-bones is lost, by ossification uniting them firmly to the cannon-bone, the want of such a piece of mechanism, essential to the quick extension of the foot, will make the horse apt to come down." *

All those animals which excel in fleetness have the metacarpal bones relatively short. This is remarkably the case in the greyhound, the hare, the fox, and other quadrupeds celebrated for speed. Of course length of limb will confer the capability of making

* Bell's Bridgewater Treatise, p. 93.

longer strides, but it is found advantageous that the other component parts of the extremity should contribute in greater proportion to this result than the cannon-bones. The muscles do not descend below the knee, but their action is conveyed by means of tendons to the points on which they are intended to act. That these tendons should be well defined and clear of extraneous tissue is important to their free action. Mr. Blaine remarks, with great truth, that "much stress is laid on the necessity that this part of the leg should be wide when viewed laterally. Viewed in front, its being thin is favourable, because, made up as it is principally of bone and tendon, any addition to it beyond these must consist of useless cellular matter, or otherwise of matter worse than useless, as being placed there by disease. Any thickening of the part, generally or partially, should be looked upon with suspicion; as, if natural, likely to interfere with motion without adding to strength; or, if accidental, as a mark of acquired injury, the effects of which are likely to remain." — *Ency. Rural Sports*, p. 265.

Little doubt can be entertained that the ossification of the elastic ligament uniting the lesser metacarpals to the cannon or shank bone is the result of over-exertion, and that when they have once become firmly cemented together, originating the disease denominated *splint*, they occasion great inconvenience to the animal if used for rapid work, giving rise to that invariable indication of hard labour, — the bent knee, so common and so truly piteous. The poor animal, dreading to throw any pressure on the posterior parts of the leg, from the absence of the natural descent of these little bones, is compelled to impose all the superincumbent weight on the cannon bone, and thus the leg is kept in a constrained position, trembling under its burden.

*The Fetlock and Pastern.* — Four bones enter into the composition of the fetlock-joint; viz. the cannon, the two sessamoids, and the long pastern-bone. The lesser pastern-bone serves to transmit the weight received from the lower head of the long pastern to the coffin and navicular bones of the foot. In the fetlock, the most extraordinary provision is evinced to obviate concussion. We have here another exception to the general inelastic character of the ligaments. From the upper and back part of the cannon or shank bone arises a strong ligament, endowed with considerable elasticity, which, passing down the leg, becomes firmly connected in its course to the sessamoid bones at the back part of the pastern-joint. It is this ligament which bears so important a degree of the stress from the downward play of the fetlock. It elongates upon the receipt of pressure, and, immediately the weight is removed, materially assists, by its elasticity, the flexor muscles in bending the pastern-joint. It is named by veterinarians the *suspensory ligament*, from its office. When over-taxed this ligament is sometimes torn through; the horse is then said, in the language of the turf, to be "broken down." In this case the fetlock comes upon the ground, and the animal is unfit for exertion ever afterwards.

Less obliquity of the pastern-bones is requisite in the fore legs than behind; in fact, this formation generally obtains. In some cases the difference is remarkable. Nature, having made such extensive provision for elasticity in the upper portion of the fore limb, economises as much as possible in order to increase the strength of the parts below. There is, therefore, less necessity for obliquity of the pastern bones of the fore legs than of those behind. Elasticity and strength may be regarded as antagonistic forces, — as one predominates the other is found diminished. Consequently, whenever strength is demanded, a more

upright pastern is indicated than when we require only elasticity. An oblique direction of the pastern bones gives to the motions of the animal a flexibility and ease highly desirable in those used for the saddle; but if this oblique inclination is carried beyond a certain extent, it is at the expense of the strength and power of the animal.

*The Fore-Feet.* — The term of *the wall* is applied to that portion of the foot which can be seen when it is placed flat on the ground; at the upper edge, or *coronet*, of this, the true hoof, is placed the *coronary frog-band*, a ribbon-like tissue, reflected from the frog around the superior rim of the foot, connecting it with the skin. The front part of the wall is commonly termed *the toe;* the sides are called the *quarters;* and the posterior parts the *heels.* At the under surface of the foot we have the *frog*, the *bars*, and the *sole.*

The true shape of the external parts of the foot is, as was first demonstrated by Bracy Clark, a segment of a cylinder, not a section of a cone, as was previously maintained. "The great utility of this general figure," says the ingenious discoverer, "will be striking, if we consider with how much more power a cylinder embraces its contents than a cone, which, enlarging downwards, would not have prevented the contents of the foot from slipping through on any strong exertion of the animal, as the cone is ever presenting a wider area in this direction. * * * * Besides, if the hoof had been a cone, by continually growing larger downwards, it would have greatly inconvenienced the animal; whereas a cylinder always remains the same: its growth also would prove it, since how could a circle, once formed at the coronet, receive within it any accessions afterwards, as such would narrow the area of the hoof inside; and that nothing is really added, a perpendicular section of the hoof shows plainly."—*Hippodonomia*, p. 34. 2nd edit.

In a well-formed foot there exist some mathematical relations between its different parts, which it is often of practical importance to bear in mind. A knowledge of these, the natural comparative proportions, may be of utility, both to the veterinary practitioner and the horseman, in detecting any deviation in shape from nature's standard. It may also be of service by teaching us what we have to keep in view in order to preserve the natural shape, and what to correct when alterations of structure have been induced.

1. The inclination of the foot from the perpendicular, when placed on a level surface, is at an angle of about thirty-two degrees. In the hind feet, however, the angle is naturally a little less.

2. That the depth of the external wall at the toe is double that of the wall at the heels, including the frog-band in both cases.

3. The depth of the wall of the foot, measuring from the coronet to the extreme toe, the length of the frog, and the space between the inflexions of the heels, exactly correspond.

4. That the depth of the wall at the quarters, equals the length of a line drawn diagonally across the foot at its lower surface — passing from the inflexions of the heels over the point of the frog to the lower edge of the wall at the toe.

5. The length of the frog is, compared to the length of the lower surface of the foot, as two to three.

6. The circumference of the foot, from heel to heel, measuring midway between the upper and lower edges, is four times the depth of the wall in front.

7. That the bars are half the length of the frog; not, as they are generally represented, of the same length.

The inside and outside quarters of the foot differ

from each other, inasmuch as the former is more upright than the latter; the advantage of this formation arises from the provision of an enlarged base of support on the outside of the foot, while the perpendicularity of the inside quarters obviates the liability of an injurious interference during progression with the opposite leg. In consequence of this peculiarity the under surface of the foot is not perfectly symmetrical. Being partly divided by the frog, we may observe that the divisions do not exactly correspond to each other, the outer portion bulging considerably more than the inner, so as to cover a greater area.

The limits of this work preclude the possibility of entering into the details of structure of this most wonderful piece of mechanism. The anatomical construction and physiological action of its component parts mark, as distinctly as any other work of nature, the power of the Creator over the material world. But as my views on one topic in connection with the foot (the means by which it is enabled to sustain the body's weight) differ from my veterinary brotherhood, I am desirous of giving them a brief notice here. The question is, how are the laminæ or plates, which connect by indirect attachments the hoof to the bone, able to resist the weight of the animal, seeing that they are not thicker in substance than parchment. It is also well known that the entire sole can be removed without endangering the protrusion of the coffin-bone. The problem is of easy solution. The plates spring from the internal convex surface of the hoof in longitudinal striæ, running from the coronet to the sole, and dovetail between similar ones radiating from the external fibrous tissue of the coffin-bone. They are continued to the heels, and follow the inflexions of the bars. The only bond of union between the two separate sets of laminæ is the

minute vessels that pass from the plates of the coffin-bone to supply those of the hoof, —arteries, veins, nerves, and absorbents. On such fragile connecting agents no force can be thrown without detriment. The supporting power must spring from some other source. In all probability it depends on a mechanical law, which I have not seen noticed or explained in works on mechanics, but which I think capable of very extensive application in the useful arts. If three equal-sized plates of metal, wood, or other material be taken, and one of them placed between the others, allowing a portion of it to protrude, then, if the two outside plates be pressed together by a sight effort, it will be difficult to force the protruding portion of the centre plate down. It is necessary to overcome the resistance of the pressure as well as that of the friction between their surfaces. If another plate be added, so as to have two protruding ones, then the same degree of lateral pressure will require a double perpendicular force to carry them down to a level. Still increase the number of plates, and though the pressure may continue the same, the resistance will be multiplied by the number of plates. To illustrate this principle in a still more familiar manner, take a pack of cards, and allow every alternate one to project in the same way as was done with the central plate. Then, by laying the cards edgewise on a table and sqeezing them together with the finger and thumb, a sufficient power will be acquired to resist the efforts of the strongest man to force those projecting to a level with the others. In this way it is that the laminæ act and react on each other, so as to support by their united effort the great weight of the animal. At the heels the plates take an oblique direction, in unison with the fibres of the hoof, sloping from above forwards, and when weight falls on them, the back portion of the foot descends from its elasticity, and thus tends mechanic-

ally to compress the other plates together, and by their combined resistance to overcome and firmly support the weight of the body. Thus the animal's weight conduces indirectly to its own support. There are not less than 2,000 laminal surfaces in the hoof, and a weak compressing agent need only be brought into action to accomplish all that is required.

Anciently the practice prevailed of using horses without shoes, consequently it was then desirable to possess such as had hard, inelastic, and contracted feet. Artificial means were resorted to to harden the hoofs, and render them more durable.

The feet of most animals are wisely provided by nature with a considerable degree of elasticity. This is familiarly exemplified by the cushions or pads to the feet of the carnivora; by the divided hoof of the ruminant; and by the arched arrangement of the pœdal bones of the human foot. Elasticity forms also an important element in the foot of the horse,— a function too often neglected in the hygeienic treatment of this organ, but meriting the deepest attention. "This inestimable property it is that guarantees the foot from fatigue, preserves it from jar, and the body from reaction and concussion, and all the injuries which a too solid resistance would have occasioned to both, and probably assisting also the animal in his advances by a return to its former figure after distension."—*Clark's Hipponomy*, p. 27.

*The Chest.*—The chest contains the chief organs of animal life,—those of respiration and circulation. The function of organs so essential to the progress of the vital processes is governed and modified by the shape and dimensions of the cavity in which they are contained. Therefore it is that a correct knowledge of the influence of an alteration in the capacity and shape of the chest, gives us a power of judging of the relative constitutional vigour of the animal.

The actual girth of the chest does not correctly inform us of its internal dimensions. Mr. Clive first directed our attention to the fact, that two animals might possess chests of equal circumference, and yet one have much larger lungs than the other. On the principle that a circle contains more than an ellipsis, does a broad chest contain a greater internal area than a deep one. In proportion as an ellipsis deviates from the circle, the less does it contain. In the mechanism of respiration, nature acts upon this law; for during inspiration, the chest assumes a circular form, and consequently enlarges; while, on expiration, the sides of the cavity approach each other, reassuming an elliptical figure, and diminishing its capacity.

The practical inferences drawn from the outward form of the thorax are important. The facility with which animals form fat, is governed materially by the shape and size of the chest. A capacious thorax contributes to the rapid secretion of the adipose or fatty tissue; while a contracted state of this cavity diminishes, in a remarkable manner, the formation of that substance. Examples, demonstrative of these facts, may be seen in the bull dog and greyhound; the first, celebrated for his breadth of chest, possesses extraordinary powers of making flesh; and the last, from diminished area and elliptical shape of his thorax, rarely accumulates fat. The one is seldom beheld in a fat or the other in a lean state. The remarkable disposition to fatten, so manifest in our improved breeds of sheep and horned cattle, may be traced to the same cause. Even among horses, where little or no effort has been made, by selection in breeding, to alter the form of the chest, we may often observe the effect of this principle. The true Suffolk punch, known to possess a round and capacious chest, forms flesh on a much less quantity of food than suffices for a similar result in most other breeds. In those ani-

mals, then, in which economy of keep is desirable, breadth of chest, which confers capacity, is requisite. The same circular form of chest is preferable for horses of slow draught, from whom substance alone is demanded; but in the racers, intended for the most rapid progression, a slight deviation from the circular shape will not be incompatible: as it is important that the respiratory functions may not be impeded, and yet that the fore legs should not be so widely separated as to prevent the hind ones from being projected easily forwards during the gallop, an increase in depth of the chest, corresponding in area to its diminution in breadth, may be allowed. We may judge of the relative rotundity of the thorax, by observing the distance between the fore legs at the breast. If they are widely separated, we may infer that the chest is circular and capacious; but if the space between them is narrow, the thorax may be deeper, but it will not certainly be of any considerable internal area.

*The Withers.* — This term is applied by horsemen to the long upright processes or spines of the first few dorsal vertebræ, rising above the shoulders, and forming often a considerable ridge. As they give attachment to the elastic ligament which supports the head, it will be noticed that an elevated carriage of the head depends in a great degree on the length and direction of these spines. When the shoulders are properly directed backwards, the withers, by being as it were uncovered, become more prominent; it is on this account that connoisseurs of horse-flesh judge of the safety of the animal by the degree of their projection, partially imputing to this part the office performed by the shoulders.

A proper elevation of the withers is indispensable in the saddle horse; they serve not only to prevent the displacement of the saddle, but decrease the liabi-

lity of coming down, and improve the pleasantness with which the animal carries himself.

*Trunk and Loins.* — The trunk of the racer is advantageously long, offering to the animal the required longitude of body necessary to give efficiency to the propulsive efforts of the extremities. When strength is a desideratum, the back and trunk may be of a much shorter character than that proper to the race-horse. A union of muscular power, and a compactness of form, is here beneficial, in preventing an unnecessary dissipation of animal exertion. Shortness of the loins confers strength. If the ribs be continued backwards to within a short distance of the bones of the pelvis, leaving but a small intermediate space between them and the hips, the horse is said, in the language of the stable, to be "well ribbed home." Sometimes it occurs that an additional rib is provided, which of course remains unknown during the animal's life, but is well calculated to give this desirable formation. Horses with great length of loins are incapable of sustaining a considerable weight on the back. The elephant is possessed of but three lumbar vertebræ, and can carry an enormous burden on his back; the horse, having five, increases the length of his loins but diminishes his strength.

The abdominal portion of the trunk remains only to be noticed. Its condition offers some criteria of the animal's health and vigour. If it is contracted, or "tucked up," in an unusual and unnatural degree, a deficiency of bottom may be suspected; nay, it often denotes a state of latent disease. Flat-sided horses are often weak, and seldom excel either on the turf or road. A fair and moderate proportion of belly is generally a good point. Circularity of carcass, by interfering less with the movements of the animal, and yet providing room for the healthy progress of digestion, is the object to be kept constantly

in view. Herring-bellied horses are generally bad feeders, and bad feeders are always herring-bellied.

Many judges of horse-flesh draw inferences from the appearance of the sheath. They imagine that an increase of its size indicates the possession of animal vigour. This is really true to a certain extent; but when it is of too great a capacity, its appearance becomes offensive to the eye.

*Croup and Tail.* — The setting-on of the tail is very characteristic of the breeding of the horse, and all those having any pretension to blood have it displayed in the graceful manner in which the tail is attached to the body. In well-bred horses the croup rises more evidently from the pelvis, and the tail appears to start less abruptly from the frame. This peculiarity of conformation confers gracefulness of carriage on the tail, an appearance considered so desirable, that endeavours are often made to produce a similar effect by resorting to the barbarous practice of nicking.

A small, tightly contracted, yet protruding sphincter of the anus, has for a long time been held as denoting superior muscular energy of the animal. Mr. Darvill, in his practical work on the race horse, places great reliance on this point. He regards it as one of the best constitutional points belonging to the horse.

*Hind-Quarters.* — There is less elasticity in the upper portion of the pelvis than in that of the thoracic or fore extremities. The reason is obvious; this property would here be far less useful to the animal, and tend also to diminish the effect of muscular contractility. Elasticity breaks the active force of muscular contraction, by interposing a spring; and all the power which is demanded to overcome the effect of that spring, is expended wastefully, so far as the actual propulsion of the animal is concerned. Therefore it is that nature, in order to give greater

efficiency to the muscles of this portion of the body, has attached the hind extremities to the frame by direct bony articulation, which is not the case with the front limbs.

The function of the thoracic extremities, as has already been stated, is to support and direct, while that of the hinder limbs is to propel the frame. These simple facts explain, in a few words, the principles which should direct us in judging of the capabilities of the animal machine.

In those quadrupeds most celebrated for their speed, we shall find upon cursory examination that the hind legs are remarkable for their length, and the muscles of the loins and quarters for their power and size. This is the case in the greyhound, the horse, the hare, and the deer species. By the length and power of its hind legs alone, the kangaroo makes the most astonishing leaps. Eclipse, the most celebrated horse of the last century, would seem to have been moulded in accordance to these principles, — the principles of fleetness. His legs were considerably shorter before than behind, the fore leg being shortened below the knee: he consequently stood higher at the croup than the withers. He possessed long muscular quarters, with extraordinary wide haunch bones, which gave him the appearance of going very wide with his hind legs, or a straddling gait, but was the means of allowing the legs to be thrown completely forwards during his wonderful performances. Length of the bones in this part not only allows the animal to take a greater stride, but provides that it should be made vigourously effectual by the corresponding length of the muscles acting on them. Speed, therefore, depends almost entirely on the pelvic extremities being sufficiently powerful to propel the whole machine with vigour and rapidity. If they are deficient either in length of leverage or muscular energy, the most

perfect formation of the rest of the body cannot make amends; on the contrary, we often see horses, otherwise badly formed, excel in consequence of the great power of their hind legs.

The acceleration of motion will be ever found proportionate to the mechanical force impressed by the muscles and bones of this part on the rest of the machine. Being the chief projecting power, the source of motion, it follows that an increase of the magnitude and vigour of these parts will augment the capability of progression. This is in exact accordance with the well-known mathematical axiom,— if any force generates motion, a double force will generate double motion, a triple force triple the motion, whether the force be impressed altogether and at once, or gradually and successively.

With regard to the comparative length of the upper and lower parts of the extremity, it will be found, that as the length above the hock is increased, that below it is diminished. This is the case also in the fore limb above and below the knee. If we have short quarters or shoulders, it follows that the column of support must be elongated somewhere, which is then done below the hock and knee. But if the animal is formed with a deep forehand and long quarters, the cannon-bones are proportionately diminished in longitude. This is one reason of the advantage usually observed to follow the possession of a short cannon, so generally and properly esteemed.

*The Haunch, the Thigh, and the Stifle.* — The haunch is composed of three irregular bones (*ilium*, *ischium*, and *pubis*) on each side, which, coalescing, forms an arch for the support of the posterior parts of the body, and the protection of the pelvic viscera. These three bones become partially consolidated into one, and form, at their point of union, a cup for the reception of the head of the upper or true thigh-bone

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(*femur*) into it, forming the *acetabulum* of the hip joint. This is a ball-and-socket joint, denominated by horsemen the whirl or round-bone; it is deeply covered with muscles, so as to be imperceptible to outward view. It is often erroneously supposed to be the seat of obscure lamenesses, and a great deal of unnecessary torture is inflicted on the unfortunate patient. The prominences of the haunch-bones give advantageous insertion to some of the most powerful muscles of the body, whose office it is to assist in the propulsion of the frame. From the hip joint the femur slants forwards to meet the head of the lower bone of the thigh (*tibia*), which, together with the *patella*, a bone corresponding to our knee-pan, constitute the stifle joint. Attached to the tibia is a small long bone (*fibula*), whose use is not very evident. The bones of the lower thigh are directed backwards, forming a considerable angle with the femur, thus giving to the muscles acting on the part a mechanical advantage which they would not otherwise possess, at the same time the weight is thrown on them so obliquely as to prevent concussion. The femur and tibia should be long for the reasons we have alleged when treating on the hind-quarters: it gives them a double mechanical power; first, by lengthening the muscular fibre itself, and secondly, by increasing the leverage at which those muscles act.

*The Hock.*— The hock joint is a part of great importance for the consideration of the horseman. It is composed of no less than ten bones, between some of which extensive motion exists, while between others the action is inconsiderable, but on them the stress of exertion falls during progression. The chief motion of the joint is between the lower head of the *tibia* and the *astragalus*. The *os calcis* forms an important feature of this joint: it projects boldly upwards from the other bones, and gives attachment, more or

less advantageous according to its length and direction, to the tendons of the most powerful muscles flexing the limb. The pressure reflected by this bone to those immediately beneath it, during the violent exertions of the animal, must be enormous. When this is properly considered, it ceases to be surprising that these parts are so liable to the disease called spavin, as it is only wonderful that they so long withstand such extraordinary and severe exertion.

*The Hind Legs, Fetlocks, and Pasterns.* — The mechanical construction of these parts is very similar to the corresponding ones of the fore extremities, which has been before described. There is little difference in the anatomy of the parts below the knee and of those below the hock; they are not, however, exactly identical, for the cannon or shank-bone is longer in the hind extremities than before. The outer splint-bone is also somewhat larger than the inner one. The pasterns are considerably more oblique in the hind limbs, for a very evident reason. The elastic play of the upper part of the fore limb being considerable, a sloping pastern was consequently less requisite; but the hind limbs possessing no such arrangement, and being attached to the frame by bone, the pasterns are wisely constructed more oblique than those before.

*The Hind Feet.* — The hind feet differ slightly from the fore ones, though the general character of both is similar. Some of the points in which they vary have already been alluded to in the description of the fore feet. The others, which will now be noticed, are induced more by position than by the existence of any anatomical difference. From the greater quantity of the weight of the body being precipitated on the fore feet, they become, generally, wider and more openly expanded than the hind ones. The hind feet are constructed more strongly, and with less regard to their elasticity, than those before; the wall, also, rises

somewhat higher, and is rather more upright. The soles of the hind feet are naturally less elastic. Disease, from over-exertion, is much more frequent to the fore feet; and the same also applies to the injuries induced by shoeing.

## HEIGHT.

The height of the horse is calculated by a measure called the hand (four inches), and the part generally taken as the most proper and convenient to give it is the highest point of the withers, measuring from the ground. In many instances, however, this only affords an approximation to his real height, and therefore must not be regarded as strictly correct. It should be remembered, that this part is liable to greater structural variety than any other throughout the body. A horse with high withers may not be absolutely so high by some inches as one whose withers are low. Sometimes it also occurs that the croup is elevated considerably above the withers. In these cases the way best calculated to arrive at a correct estimation of the height of the animal would be, to ascertain the elevation of each part, croup and withers, and then take the mean of the two measurements. Allusion has been already made to the attempts to estimate the future adult stature that the colt will probably attain, by admeasurement of his legs (p. 15, *et seq.*); but such computations are almost nugatory if performed before he has completed his second year, or at least the inferences are far from being satisfactory. After that period the causes of error will be lessened, and indeed the ultimate height may be then very closely precognised. In full-grown horses it is found that the length from the exact centre of the elbow, to the exact centre of the fetlock joint,

almost invariably equals the distance from the first point (the elbow) to the top of the withers. At two years old the bones of the legs have generally attained their fullest growth, but the depth of the shoulder and the elevation of the withers increases until the fifth or even the sixth year. Thus after two years there is a good criterion of the adolescent stature of the horse, for we have only to double the length from the elbow to the fetlock. *

Peculiar names are applied to varieties of the horse, according to the heights which they attain. Thus all under thirteen hands (fifty-two inches) are denominated *ponies*. The *galloway* does not exceed fourteen hands (fifty-six inches). The *cob* is not altogether named from its height, but is applied to a sturdy, stiff-built, short-legged nag.

## THE COMPARATIVE UTILITY AND VALUE OF THE TWO SEXES.

The male sex of most animals is remarkable for superior size and strength. This is so generally the case, that it is customary to regard power as the peculiar attribute of the male, and effeminacy, as the term implies, as that of the female. This distinction is much more evident among the ruminating animals than the equidæ. In the latter it may be said to be but faintly marked, if at all discoverable. The two sexes of the horse have each found their advocates, but they are almost equally valuable and serviceable; if the mare was less useful than she really is, it would materially affect the economy of their general application. That they are both useful, and equally so, cannot but be regarded as a providen-

* See a communication of Mr. Friend's, in the Veterinarian of September, 1842.

tial ordination. The mare is not incommoded by any enlargement of udder, as to interfere with the most rapid motion, for she is able to contest the palm of fleetness with the male. She vies with him also in muscular strength and in general utility. The mare, in common with females of most animals, possesses comparatively a greater width of the pelvic or haunch bones than the male. This circumstance is so well known in human osteology, that anatomists can readily assign the sex of the skeleton by admeasurement of the pelvis alone. An increase in the lateral capacity of these bones, as has been before shown when treating of the hind quarters, by offering enlarged surface for the attachment of the propelling muscles, and by mechanical position allowing the hind limbs to be thrown freely forwards clear of the trunk, facilitates the action, and allows of greater speed. This advantageous formation bestowed on the mare would seem to counterbalance any drawback naturally attending her, and thus she rivals in fleetness and in utility to mankind her companion sex.

The people of South America are prejudiced against the mare; it is considered highly disgraceful to use them for the saddle; they are consequently reserved for breeding and a few purposes about the estancias. Even in this country some people are so extremely fastidious as to object to the employment of mares, in this way often rejecting more serviceable animals than they employ. "It is much to be lamented," says the late Mr. Apperley, "that among sportsmen the prejudice against mares is so strong, as, in consequence, the value of many good hunters, and subsequently many good brood mares, is never known; for being so generally rejected by those persons who would give them the fairest chance of distinguishing themselves, they fall into the hands of farmers and others, who cannot for obvious reasons give them

that opportunity. If we look back to the great performances on the road against time, we shall find that by far the greater number of them were by mares; and Eleanor winning the Derby and the Oaks (in 1801), and the running of Lord Grosvenor's Meteora, were perhaps never excelled, if equalled, by horses. The Arabians have always preferred mares to horses. They have always been found to endure hunger and thirst, and all other privations, better; and although in our climate horses are seldom put to the test in this respect, yet, when travelling between the tropics in a desert, it must be a valuable consideration. In a race, it is true, mares are put on a par with geldings; but it must be admitted that they are more perfect in their nature, and, with the exception of the period of genial desire, I conceive them to be more than equal to them in any kind of exertion on the road or in the field." — *Nimrod on the Condition of Hunters*, p. 12.

In the celebrated Olympic games mares appear to have acquired more renown than did ever the other sex. The mares of Cimon contended for and won, thrice in succession, the prize in the chariot race. They were buried in a grave opposite to that of their master, so famed together in life that they were not separated by death. This feat was again accomplished by the mares of Evagoras of Lacedæmon, but, according to Herodotus, these were the only instances of its occurrence. Pliny states, that the Scythians preferred the mare to the horse, probably for the same reasons that they are employed by the Bedouin Arabs, because they seldom neigh, are more docile, produce them foals, and yield their milk. The enterprising Bruce assures us, that "no Arab ever mounts a stallion; on the contrary, in Nubia they never ride mares. The reason is plain; the Arabs are constantly at war with their neighbours (for so robbery is called in that

country), and always endeavour to take their enemies by surprise in the grey of the evening, or the dawn of day. A stallion no sooner smells the stale of the mare in the enemy's quarters than he begins to neigh, and that would give the alarm to the party intended to be surprised. No such thing can happen when they ride mares only. On the contrary, the Funge trust only to superior force. They are in an open plain country, must be discovered at many miles distance, and all such surprises and stratagems are useless to them." — *Travels*, vol. vi. p. 433.

## CHAPTER IV.

### PACES, ACTION, DRAUGHT, SAFETY, AND SPEED.

"If a horse is fit to go a Travelling-pace, let him do it; if he is naturally inclined to make Curvets, he must be put to it; and so of the Demi-airs, Passadoes, Terre-à-terre, Croupades, Balotades, and Capriols. If he be not fit for any of these, put him to run the ring; if he be not cut out for that, use him as a drudge to go of errands. If none of these suit him, he will perhaps be fit for racing, hunting, or travelling, or for the portmanteau, for bundles, or for coach or cart; or, in short, he may be fit to turn the mill, or some such use as that; so that it is the fault of the horse-man, and not of the horse, if he passes for a jade; for really there is no horse but what is fit for some use or other."—*Duke of Newcastle's System of Horsemanship*, vol. i. p. 17.—1743.

In a state of inaction the four extremities of the horse serve as so many supporting pillars, but during progression the use of each pair of limbs is essentially different. While the locomotive impulse is imparted by the posterior extremities, the anterior ones serve principally to bear and transmit the burden imposed upon them, from place to place, at the will of the animal. Some importance was attached to this difference of function between the fore and hind limbs when the physical conformation of the animal was considered: it is quite as necessary to bear this distinction in mind now that the several methods of progressive motion are passed in review.

The bones are of course the chief supporting agents of the body. They afford by their unyielding nature sufficient mechanical firmness to the extremities to enable them to bear the superincumbent weight. But provision is made at the same time to bestow ease and elasticity on their motions by the oblique direction in

which they meet each other, by their articulating ends being covered with elastic cartilage, by ligamentous extension, and by the expansion of the feet when pressure is thrown upon them. These relieving agents are called into action during the ordinary and extraordinary exertions of the animal, or even when he is standing quite still, and on them is reflected a great share of the horse's weight.* The parts on which the pressure chiefly falls, and which by great elasticity and other mechanical peculiarities serve to ward it off, are the suspensory ligaments of the fetlock joints, and the laminæ of the hoofs. On these points the force is distributed in proportion to their respective structural power, but it is naturally prevented from falling injuriously on either of them by the presence of resistant pliability. Still the injurious effects of taxing the animal beyond his power are often evident at one or other of these points. In such cases the suspensory ligament is sometimes severed by the violence of the strain put upon it, and the coffin-bone is frequently partially torn from its attachments to the wall of the foot, giving rise to flattened and convex soles, and pumiced feet.

*The Walk.* — Although there are not two kinds of the walking pace, yet the relative position of the leg alters with the rapidity of the pace, so as to give it, descriptively at least, a double character. In the slowest walk there are always three feet upon the ground at a time, forming as it were a triangular basis of support, continually shifting, yet always preserving the centre of gravity unaffected. As the pace is increased to the usual walk, two of the legs

* Professor Coleman used familiarly to elucidate the usefulness of elasticity in parrying concussion or jar by instancing the effect produced in catching a cricket ball: if the hands be held firmly against the ball as it enters them a disagreeable shock results, but by slightly retracting them, the momentum of the projectile being gradually abated, no injury follows.

are flexed at the same moment, and the body is supported by the others. Walking may be analysed into four different acts, which occur in determinate order. Thus, the near fore foot being advanced first, the diagonal extremity, or off hind foot, is next removed from the ground, then the off fore foot, and lastly the near hind foot; the two diagonal extremities always following each other in their movements, while the other two support and project the body. By the simultaneous flexion of the diagonal limbs in preference to those of the same side of the body, the carcass of the animal is safely preserved in its position, but little oscillation occurs, and that little being rendered less by the opposite and counterbalancing motion of the head and neck. The hind feet are not usually placed on the exact spot vacated by the fore ones, but, in good walkers, on level ground, a little in advance of the impression left by them. This is a matter of some consequence, as it proves that the animal is endowed with considerable compass of the hind limbs. A horse of unfavourable form, deficient in power in the quarters, steps short of the track left by the fore feet; but a well-made animal would only do this when burdened or going up-hill.

The walk of the turf horse is generally good; Cotherstone, the winner of the Derby in 1843, was particularly graceful in this pace. The London dray-horses are drilled into much quicker walkers than the heavy horses of the country. Many horses can compass five miles within the hour in this pace. Six miles, the maximum, has occasionally been done. It is a common observation, that when a horse walks well, his other paces will also be good; and this is likely to be correct, for that symmetry which confers the one is well calculated to produce the other; yet, though this is generally true, exceptions to the rule often occur. I once possessed a hack that could

gallop well and trot excellently, still he was nevertheless a most wretched walker.

*Slow Draught.* — Animal strength was, in all probability, the earliest motive power employed by man to abridge his own labours; and although modern science has discovered more potent and less expensive mechanical forces, yet animal exertion, from its peculiar nature, will ever continue of great service to the human race. In the innumerable industrial purposes of slow and heavy draught to which the horse is applied, walking is the general pace. It is therefore important that animals thus used should be good walkers, and adapted for the purpose. When it is desirable to transport great burdens, the weight of the animals employed should be always commensurate with the object in view. *Power* must characterise the physical construction of our heavy draught-horses. Against the burden, it is not only requisite to oppose great muscular energy, but *weight* must also be thrown into the scale against it. The fore-hand of the heaviest draught horse should be rather depressed and heavy, and the hind quarters cannot be too muscular. The breast should be broad, as it demonstrates the possession of a circular chest, which confers not only constitutional energy, increases the weight and improves the wind, but it bestows a capacity of forming flesh rapidly and economically. The shoulders may be upright, and all the fore parts of the body, to a certain degree, loaded. It is desirable that the legs should be short. The utility of a heavy fore-hand in horses of slow draught is readily and practically demonstrated. Whenever it is necessary to move a greater weight than the animal is fully equal to, a portion of the burden may be profitably thrown on the horse's back, so as at once to diminish the weight of the load, and increase his capability of impelling it. Another proof exists in the evident advantage re-

sulting from the use of a heavy yoke for oxen over every other form of attaching them to their work. The weight of this instrument placed on their necks increases their drawing power. A similar motive may have directed the *habitans* of Normandy to adopt their characteristic heavy horse-collars and housings, for which they are so remarkable.

I am anxious, in this place, to add my anathema against that inhuman instrument of torture — the bearing-rein. It is no less detrimental to the utility of the animal than it is replete with agony to him. It must have been invented by a savage, and can only be employed by the insensate. Whence the benefit of unbearing a draught-horse when going up-hill? Because the head can then be thrown into its natural position, and materially assist by its weight in drawing the load. If it is beneficial to loose the head at that time, it must also be so on other occasions. Look at the elongated mouths of the unfortunate animals thus so wantonly abused — torn by the bit in their unavailing efforts to overcome this truly barbarous instrument! What produces that dreadful disease — poll-evil, but the action of this cruel strap, constraining the head during the violent exertions of the animal, producing inflammation and ulceration of the point upon which it articulates with the spine? Poll-evil, so generally supposed to originate from blows inflicted on the part, is attributable alone to the gagging-rein. I never saw a horse used entirely for the saddle attacked with this affection. In order to obtain momentary relief from the torment inflicted by the bearing-rein on the poll and mouth, the poor creature is compelled incessantly to toss up his head. By thus strapping down the head you say, practically, "I expect you to draw a certain weight, but I will take away part of your power of doing so." Some have urged, that the bearing-rein contributes to

the safety of the animal, who, without it, would be more liable to come down. However applicable such an argument may be to those employed in quick draught, though even with them the utility of this instrument is not only exceedingly doubtful but fast giving way to a more rational method of treatment, it assuredly does not apply to cart horses, for little fear is ever entertained of their falling, and broken knees, so common among the faster breeds, is rare amongst them.

Horse power is much more economically employed in *drawing* than in *carrying*. This will be explained at once by reflecting on the mechanical construction of the body. The legs support the trunk in a horizontal position, and the propulsive power of the hind limbs far exceeds the capability of the spine to bear weight. Pressure applied on the spinal column from above would be more likely to do injury than if applied in the direction of its course. In the first case the stress would fall chiefly on the ligaments uniting the bones of the vertebræ, and in the latter the bodies of the bones would be themselves brought into action. Animals, such as the elephant and dromedary, who are capable of supporting heavy weights on their backs, have their spines more or less arched upwards; a simple modification of construction enabling them easily to resist vertical pressure. The bridge is no longer a suspension one, in which the ligaments are the sole resisting agents, as in the horse, but a mechanical arch, where the weight is borne by the bodies of the spinal bones themselves. The average strength of a horse, compared to that of man, is as one to six; but it has been observed, that three men loaded with 100lb. weight each will ascend a hill much more easily than a horse carrying 300lb. on his back.

In attaching one or more horses to a load, it should always be remembered that their strength cannot be applied without loss if the traces by which they are

appended possess the least elasticity; for the power expended in putting the elastic material on the stretch before the animal exertion can affect the weight to be moved, is completely thrown away, as far as regards the actual draught. This is one reason why horses pull more advantageously when placed abreast than when attached one before the other: a degree of power is exhausted in keeping the great length of traces on the stretch, one horse often, as it were, not exerting his powers to move the load, but expending a portion of it in relieving the pressure from his associate's shoulders.

Our largest description of draught horse is bred in the northern and midland counties of England, chiefly in Lincolnshire. It is principally the produce of a remote cross between the native breed and the heavy Flanders horse. The lighter sorts of slow draught horses are the Cleveland, the Clydesdale, and the Suffolk punch.

## THE TROT.

This pace being intermediate between the tardiness of walking and the too exhausting exertion of the gallop, is the most ordinary method of easy and agreeable progression. In it the muscular powers of the animal are prolonged in their action, yet the speed obtained is considerable. It is the prevailing pace of light draught; the energy of the horse when trotting is less dissipated; he is collected, and capable of increasing or diminishing his pace on the least signal.

The camel trots by extending the two legs on the same side nearly simultaneously, which gives to it a rolling and unpleasant gait; but when the trot of the horse is closely observed, it is found he poises his body for a time on the diagonal limbs, while the others are thrown forwards. When the pace is accelerated, there is a short space of time wherein all

the feet are off the ground, for before one pair is set down the other is elevated. As a consequence of two legs being raised at the same moment, two are also brought to the ground nearly together, in this manner dividing the concussive effect between them, and preventing its falling with too great force on one limb; so that the hind legs in this pace act not alone as propellers, but as recipients of a portion of the acquired impetus. According to the rapidity of the trot, so are the extending muscles of the quarters exerted, and their action is rendered more efficient by its being concentrated into a spring or jerk, propelling the body forwards with greater energy than by a more equable motion. The Persians, the Arabians, and the Moors of Barbary and Morocco, whose habits are so purely equestrian, do not suffer their horses to adopt this pace, probably from the fact of its being less pleasant to the rider.

The trot varies in rapidity from four miles to nearly twenty miles an hour. As it is customary to trot matches under heavy weights, it has not, I believe, been correctly ascertained what is the maximum speed this pace is capable of under a feather weight. One mile has been trotted in three minutes. Mr. John Lawrence writes, that "as a man must be born a poet, so a horse must be born a trotter, or he certainly will never make one of any consequence in a racing view. It depends chiefly on form." That anatomical construction materially influences the motive power of the animal no one will deny, still mechanical adaptation, though the principal cause, is not the only one which contributes to excellence in trotting. *Size* has here a remarkable influence on rapidity. The fastest trotters are seldom of large size. Excellence in this pace appears quite incompatible with considerable length of limb. The celebrated Tom Thumb was about fourteen hands high, and Mr. Lawton's Little Driver was still lower.

Numerous other instances of the general smallness of trotters might be adduced in corroboration, were it necessary; but it certainly cannot have escaped the notice of the merest tyro in horse-flesh, that the majority of fast trotters are diminutive horses, that good large horses are scarce, while almost every pony is a miracle. This excellence would appear to arise from the power they possess of rapid muscular action, as before alluded to when treating particularly of the muscles, a power inherent in small muscles, and increasing as they diminish in bulk. It is natural to infer, that if to the property of alternate vivid contraction and relaxation of the muscular tissues, which prevails in the smaller animals, be added that of propriety of form, the pace will be good. It appears requisite to preserve a medium between the leverage of limb necessary to give efficiency to the step, and the shortness of muscle which bestows rapidity of action.

Horses are said to be cross-made when their forelimbs excel in power their companions; or, on the other hand, when the hind extremities possess more compass than those of the fore parts of the body; in the latter case, when in action, the shoes of the hind feet are apt to come in contact with the front ones, giving rise to the unpleasant noise termed *forging*. In both instances the action and pace of the animal are deficient in that consonance, and the steps want the regularity and cadence, so admired in the more perfectly constructed. In trotting, it is not alone necessary that the limbs should be separately well formed, but they must accord with their companions in length of flexion and power of action.

*Racking* or *Running*. — A variation of the trot, which is termed "*running*" in this country, and "*racking*" in America, is possessed by many fast horses. The celebrated American horse Rattler was a racker; and indeed in the United States racking

matches are quite as frequent as trotting matches; each variety of race possessing its admirers and partisans. This running pace differs from the fair trot, as the legs are not so much elevated during action, nor are the steps so long. What appears to be lost in length of stride, is made up in quickness. Its appearance is shuffling and unpleasing.

*Quick Draught.* — To apply horse-power to slow draught, one principle is chiefly kept in view — to adapt the weight of the burden to the tractive force of the animal, but this is not alone sufficient in considering more rapid draught. Not only is it necessary to estimate the power of the horse, but his speed, and the pace desired to be accomplished, must also be borne in mind. Without reflecting on these together, we shall be apt to demand more than it is possible he can render. More horses incur premature death by the ignorant misapplication of them to purposes for which they are not naturally adapted, than from any other cause, or from all other causes put together. We often see horses working together at the same vehicle with widely dissimilar qualifications, or with equal power as to draught, but of unequal speed. The saying, so frequent among horsemen, "It is the pace that kills," is only partially true. It is equally fallacious and destructive to apply the weak to pull heavy weights, as it is to put a slow horse beyond his natural capabilities of speed. Having ascertained the continuous pace of a horse to be ten miles an hour, under a feather weight, and his muscular power or force of traction to be equal to 500 lbs. at a dead pull, it is a matter of simple calculation to discover what weight he will be able to draw at any given number of miles under that of his natural speed. If five miles per hour be the required velocity, being half of his pace, then the load ought to be 250 lbs., or one half the burden he is equal to. As

you increase the velocity you must decrease the weight of the load, or, as you increase the burden, you must decrease the velocity.

With respect to the method of attaching a horse to his load, in order that he may use his tractive force without detriment, it is only necessary to remark, that the traces or attachments should be inelastic, should take a horizontal direction from the collar to the vehicle, and should be free in their course; for if they are connected with the pad, a portion of the power is sometimes injuriously thrown on the back, a misdirection of his strength tending greatly to exhaust him. In the patent hack cabs, introduced by Hansom, part of the weight of the horse is judiciously relieved or balanced by the weight of the driver, who sits at the back of the carriage. This arrangement is particularly advantageous when the horse has a heavily constructed fore-hand, as it relieves his feet and increases his capabilities of progression. But it must act detrimentally when the horse is not fully equal to the propulsion of the cab, by taking away a portion of the weight which should be thrown into the collar to assist the draught.

*Action,—Safety.*—In accordance to the extent or degree that the animal bends his knees and hocks, and consequently lifts his feet to a greater or less distance from the ground, so are the terms high and low action applied, though in common parlance the word *action* denotes that which is high. Action consists of nothing more than a vigorous flexing of the joints, particularly that of the knee, to which it is more generally restricted, and is frequently regarded as a proof of safety and of the possession of other valuable qualities. But when this opinion is analysed it is not found strictly correct, for high action is often the result of peculiarity of breed, conferring no great advantage, but contributing more to the pompous

manner of progression, *ad captandum vulgus*, than to the speed, safety, or utility of the animal. The breeds most celebrated for this peculiarity of gait, and in whom it is found in excess, are the white Hanoverian and the black Flanders. They are both selected for purposes of display, the first for the parade of state, and the last for funeral processions. This excessive and inordinate knee action results probably from an absence of the natural balance of power between the flexor and extensor muscles, and cannot be invariably regarded as an evidence of general muscular energy.

There are reasons to be drawn from the mechanical construction of the animal, why the action should be of a medium character — neither too high nor too low. As the joints of the extremities project more than the shafts of the bones, it follows, that if the knee is bent so as to make the foot pass the opposite leg at the joints, it will be so much the more likely to strike and do injury than if it passed at the shaft of the bone where the space is less encroached upon. Therefore, if the action is too high, the foot often strikes the opposite knee, and if too low it is liable to injure the fetlock-joint. Thus the trot is increased in safety by the leg being so flexed that the foot passes the other leg above the fetlock-joint, and yet beneath the knee. But other disadvantages accompany high action; for the horse is not only particularly subject to strike the under part of the knee with his foot, giving what horsemen term the "speedy-cut," but he is much sooner distressed from the greater call on the muscles, and the concussion with which his feet meet the ground is also materially increased. These are three drawbacks to the captivating appearance of knee-action, and are all, more or less, inseparable from it. A horse of low or moderate action is far more capable of continued exertion on the road than any other; he is

less likely to tire and less liable to the evils which await concussion. Nimrod forcibly asserts that "one most essential quality, a *sine quâ non* in a good hack, is, that he should go near the ground, and yet go safe."

The opinion expressed on knee-action by the accomplished Xenophon, in his work devoted to horsemanship, is not exactly in accordance with our own. He remarks, that "if the foal, when walking, bends his knees pliantly, you may reckon it probable that, when ridden, he will have pliant legs. For they all, in the course of time, bend their knees much more pliantly. Flexible knees are justly held in repute, inasmuch as they render the horse less liable to stumble and shake the rider than stiff legs." Now, the true cause of stumbling cannot assuredly be altogether referred to the degree in which the knees are bent, for a horse may bend his knees to his chin and yet be very liable to come down, and another may scarcely move his feet from the ground and still be surprisingly sure-footed. It may be traced more to the manner in which the foot meets the ground, and to the position of the limb with regard to the body it supports. If the power of the shoulder is curtailed by an upright formation, the muscles will be inefficient in projecting the leg forwards, and will endanger a loss of the centre of gravity; or, if the extensor muscles of the arm are deficient in strength, the foot, on approaching the ground, will not be sufficiently elevated at the toe to prevent its being doubled under, and thus throw the animal down.

*Disease* materially affects the natural and usual motive actions of the extremities, both as respects the manner in which the feet are withdrawn from, and replaced on, the ground. Spavins behind, and any lesion referable to the shoulder and humerus before, almost invariably tend to produce a sluggish and incomplete flexion of their respective limbs, and oc-

casion a dragging of the toes. Many diseases of the feet are at once revealed, to the practised eye, by the manner in which they are thrown forwards and brought to the ground. The motive power may be still the same, but the animal's experience teaches it to bring its feet to the earth in a way which gives it as little inconvenience as possible. Under these circumstances the action is frequently symptomatic of disease. The gait, which should be free and fearless, is become shuffling and hobbling: there exists a fear to project the feet well forwards, which too evidently shows that all is not right.

### THE AMBLE.

The amble is considered an artificial mode of progression, as it is generally the result of education. By some it has been termed a pace of defect, from its being sometimes naturally assumed by the young, the weak, and the badly formed. In this pace the animal is propelled forwards by the nearly simultaneous flexion of the fore and hind legs of each side of the body alternately. It gives a rocking but easy seat to the rider. Horses are first induced to adopt it by tying a rope to the fore and hind fetlock of the same side, so that the legs are compelled to move nearly together. This pace was formerly much cultivated in this country, and such is still the practice in some parts of South America, where horses are broken to it at an early age. When properly instructed they are there termed *aguilillas*, and, when allowed to breed, propagate a race to which ambling appears natural. For it is somewhat remarkable that this manner of locomotion, in common with many other cultivated habits, is transmissible from the parent to the offspring, which evince it without any preliminary instruction.

## THE ROHAN.

The Turks and Egyptians cultivate a pace of ease called the rohan, differing essentially from the amble, and horses broken to this pace are used by the affluent (who object to the trot) for riding in towns, wherein it is illegal to gallop. The manner of producing it is by attaching around the pasterns of the hind legs metallic discs or rings, generally of lead, in weight and number apportioned to the age and strength of the colt, and the progress of the lessons, which, preventing the flexion of the fetlock-joints, alters the character of the pace. The office of the fetlock-joints being performed vicariously by other portions of the limb, has the effect of decreasing the concussion to the rider, but gives the animal a very wide-going, broken-backed, and awkward appearance. After a considerable time the weights are removed, and the artificial pace remains permanent.

## THE CANTER.

In the canter the two fore limbs are elevated and thrown forward at the same time, and allow of a similar extension of the hind legs, which immediately follow. Though both the fore feet are in the air at the same moment, yet they do not come down exactly together, as the leading foot meets the ground an instant before the other. The transition from the trot to the canter is very readily effected. A peculiarity of the canter is, that though the motions of either pair of limbs is almost simultaneous, yet, when the feet are placed on the ground, they are not in rank, but one foot is considerably in advance of its companion. This description applies to both hind and fore feet, and produces a characteristic sideling appearance in this variety of progressive motion.

Mr. Apperley (Nimrod), to whose opinions great weight is often deservedly attached, gives his decided preference to the canter as a genteel pace. He says, "A very quick trot is a most ungentlemanlike pace, and only fit for a butcher; besides which, it wears out a horse much sooner than a canter, from the weight being thrown on one fore-leg, at the same time; whereas in the canter, it is equally divided between both." There is, however, good cause to suspect the rectitude of this opinion. The weight is certainly received with less concussion in the canter than in the trot, but yet the stress of projection is much greater. The canter may be advocated on the grounds of its comparative ease and gracefulness to the equestrian, and, perhaps, from a slight advantage as to safety, but it is very questionable whether it is less laborious to the animal. The alleged superiority as to sure-footedness, arises, partially from the relieving manner in which the feet come to the ground, and partially from the fact that in the canter there is no period in which the legs are all in the air, as is the case in the lunging trot and the gallop. The absence of concussion to the rider makes the amble an indispensable one for the lady's horse.

### THE GALLOP.

The gallop is not the canter with greater speed, for there is a characterising difference. The fore-legs are alternately succeeded by the hind-legs. If the motions of the fore-legs are not exactly simultaneous in the less rapid gallop, they follow each other in such quick succession, that when the pace is increased, the ear fails to detect any interval between the sounds produced by the fall of the feet. Three sounds are

produced,—two by the falling of the fore feet to the ground one after the other, and one by the hind feet falling together; and three sounds are also produced when there is an interval between the falling of the two hind feet and none between that of the fore ones. At the full gallop two sounds only are heard, the alternate beat of the fore and hind feet.

Sir Everard Home has observed, that "from the walk to the trot, and from the trot to the gallop, there in an increase in speed generally in arithmetical progression. A horse that can walk five miles an hour can trot ten and gallop twenty; but as the fatigue is proportionally increased, the distance he can go will be diminished in the same proportion. This observation, although it applies to the race horse, will not do so to the cart horse; the last is unable to double his speed by the gallop, for which he is ill adapted."—*Lectures on Comp. Anat.* p. 129. It is asserted that the celebrated turf horse Hambletonian, covered 21 feet at a stroke, during a sharply contested race with Diamond. Eclipse, when at the full extent of his speed, covered 25 feet at each bound, and moved over 83½ feet in a second.

*The Charge.*—As the gallop is the pace at which a cavalry charge is made, and as the effect is generally commensurate to the rapidity of the charge, it becomes a question whether or not an improvement might not be effected in the majority of our cavalry regiments, by choosing horses of a better breed, by selecting men of lighter frame, and by equipping them in the simplest possible way. That which would be lost in weight might be more than doubled in rapidity. Racing experience has taught us the effect a few pounds' weight has on the pace. The cost of keep would be lessened, and the endurance of both men and horses increased. In military matters, rapidity is

sometimes all in all. "The horseman and the horse," said Frederick the Great, "should be one animal. They ought to be a centaur; and the spur is of more use than the sabre. The power of cavalry is in the rapidity of the charge."

*Racing.*—Our present race-horse measures higher than those of bygone notoriety. Fifteen hands was formerly thought an extreme size. Darvill fixes the most proper standard at 15 hands, or 15 and an inch.

But it must be observed, that though the character of racing admits of little variety, yet circumstances must occur in which comparative height is of considerable consequence. In running short or long lengths, under high or low weights, in courses of a flat or hilly, or straight or circular kind, the height as well as the length of the animal, must be a matter of some importance.

As a general rule, the form of the racehorse should offer to the eye no violation of the principles of beauty. A certain consent should prevail throughout the whole of his structure. Even those points known to confer esteemed virtues, should not be allowed to exceed the just propriety of nature's laws. Unison of shape, a balance of power, and a harmony of the whole frame, is necessary to perfect symmetry.

The head of the bloodhorse should be small, light, and clean, and carried gracefully at the end of a neck of moderate length, deep, thin, and straight at the crest. The height of the withers is not considered a material point, but the shoulders should be obliquely inclined backwards. The back is preferred moderately long and straight, but the loins must be broad and of great substance. The croup should be continued in a straight line with the back, so as to give an increased surface for the attachment of muscles. The chest must be capacious, and of moderate breadth

in front. Some discrepancy of opinion exists with regard to the size of the carcass or belly: many trainers contend that a tucked-up appearance is favourable to rapidity of progression, knowing that fleet animals often assume this form; but I cannot but regard these opinions as somewhat extreme, and always prefer the "middle piece" of moderate capacity, neither too large nor yet contracted. The arm may be of considerable length, and the upper part, near the elbow, should be well furnished with muscle. The knee-joint is advantageously large, and broad and flat in front. The cannon short, broad, and flat; and the fetlocks strongly formed and well knit. The pasterns should be of a medium length and moderately oblique. The hind quarters must have breadth, substance, and length of muscle. (See *Conformation*, Chap. III.)

"I like to follow nature; and it is seen that all animals she intends to be swift are made in the same manner, with short legs before (and particularly so from the knee downwards), long in the quarters, with good length of back, and lower at the shoulders, than at the rump. Hares, and greyhounds, and deer, are made thus; and Eclipse, undoubtedly the first horse produced for the last century, was formed nearly in the same mould."—(N. H. Smith's *Obs. on Breeding for the Turf*, p. 50.) Mr. Darvill places reliance on the contracted and projecting appearance of the anus, and regards it as one of the best constitutional points appertaining to a horse. Should a racehorse possess this mark of a good stamina, together with "a great width between the hips, with a good broad surface of loins, as also a spacious chest, his having these four constitutional points will make up well for any apparent deficiency of the want of carcass; and further, a horse thus formed, as regards the whole of the

points mentioned, is at all times a good feeder, and with little trouble he is soon got ready to run, as he is invariably a good winded horse."

I alluded before to the apparently unnatural length of the foal's legs, when compared with those of an adult animal, and also to the opinion that this singular formation had been regarded as the means of enabling the young animal to keep pace with its mother during flight from attacks of wild beasts or any other menacing danger. Such may, or may not, have been the object designed by the Creator, or it may form but one of other useful endowments bestowed by so striking a peculiarity. Another reason for this form might be that the colt is better able to reach the udder of its dam. This length of leg is very evident for some time, but gradually becomes lost as the animal approaches the period of adolescence and full growth. The light body supported by legs capable of rapid motion confers a fleetness comparatively exceeding that of the adult animal, the weight of whose body has increased without a proportionate increase of the length of his legs. Not that I would advocate an adoption of this formation in the fully-formed horse, I am only endeavouring to attract attention to this peculiarity having originated the practice on the turf of running young horses ere they become entirely divested of this legginess. They enter the field at two or three years old, attain a rapid pace, and contend for the most valuable stakes offered, without it ever entering the heads of sporting men, that although the speed may be good for a short distance, yet the animal is still incomplete, and is not calculated to transmit to its offspring, or to benefit the country by the production of, any useful quality beyond that of an unsubstantial and short-lived fleetness. I will extract a short passage from the useful work of Mr.

Smith (*on Breeding for the Turf*, p. 90.), which strengthens the opinion I have here expressed. "It appears," says he, "that our race-horses at present, in general, measure higher than formerly, since, in describing the most celebrated stallions of former times, fifteen hands is called a large horse. I am apt to suppose this proceeds from our stock being *more leggy, and that they have not so much substance, bone and muscle*, and therefore not capable of carrying such high weights, or running on so well. But is it not a natural conclusion, that our present style of racing must have changed the forms of our racers? Formerly they ran long distances with heavy weights, and now short distances with light weights."

It must be obvious that the practice of racing should be such as to encourage and promote the qualities desired to be perpetuated, and such as are of the greatest public value. Thus in Persia, continued speed being the object required, the race is protracted for several days, so as to be a severe test of endurance; a quality of considerable importance in travelling from one part of the country to the other, and in transmitting expresses. On the contrary, in South America, where sudden speed is useful, and commonly called for in taking wild cattle, the race is exceedingly short. In these instances the qualities sought to be encouraged, are those of the greatest and most common use. So in England, something besides speed being requisite, it should be the study of those possessing influence in these matters, to direct the public taste to the encouragement of qualities of national importance. Marshal Marmont judiciously observes on this topic, that "Les encouragemens, les prix, les primes, devraient être calculés sur des épreuves applicables aux besoins des divers usages publics et domestiques, et non pas être la récompense d'un mérite idéal."

## LAWS OF RACING, ETC.

(*From the Racing Calendar.*)

Horses take their ages from the 1st of January; *i. e.* a horse foaled any time in the year 1845, is one year old on the 1st of January, 1846.

Catch-weights are, to appoint a person to ride without weighing. Feather-weight signifies the same.

A Post-Match, is to insert the ages of the horses, in the articles, and to run any horse of that age, without declaring till you come to the post to start.

Handicap weights, are weights according to the supposed abilities of the horses.

Riders must ride their horses back to the winning post to weigh; and he that dismounts before, or wants weight, is distanced.

The horse that has his head at the ending post first, wins.

If a rider fall from his horse, and the horse be ridden in by a person of sufficient weight, he will take place the same as if it had not happened, provided he went back to the place where the rider fell.

Horses are not entitled to start without producing a proper certificate of their age, &c., if required; except where aged horses are included, in which case a horse may start without a certificate, provided he carry the same weights as an aged horse.

For the best of the plate, when there are three heats run, the horse is second that wins one. For the best of the heats the horse is second that beats the other twice out of three times, though he doth not win a heat.

When a plate is won at two heats, the preference of the horses is determined by the places they hold in the second heat.

When three horses have each won a heat, they only

must start for a fourth, and their places will be determined by it. No distance in a fourth heat.

In running of heats, if it cannot be decided which is first, the heat goes for nothing, and they may all start again, except it be between horses that had each won a heat. Horses drawn before the plate is won are distanced.

A bet made after a heat, if the horse betted on does not start again, is no bet. A confirmed bet cannot be off, without mutual consent.

Either party may demand stakes to be made, and on refusal may declare the bet to be void.

If a party be absent on the day of running, a public declaration of the bet may be made on the course, and a demand whether any person will make stakes for the absent party; if no person consent to do so, the bet may be declared void.

Bets agreed to be settled in town or any particular place cannot be declared off on the course.

The person who bets the odds has a right to choose his horse or the field; when he has chosen his horse, the field is what starts against him; but there is no field unless one start with him.

If odds are bet without mentioning the horse till the race is over, it must be determined as the odds were at the time of betting.

Bets made in running are not determined till the plate is won, if the heat be not specified at the time of betting.

At Newmarket, if a match be made for any particular day, in any meeting, and the parties afterwards change the day, all bets must stand; but if altered to a different meeting, bets made before the alteration are void.

Bets determined though the horse does not start when the words "absolutely" "run or pay," or "play or pay" are made use of in betting.

All double bets are considered as play or pay.

Horses running on the wrong side of a post, and not turning back, are distanced: horses are distanced, if their riders cross or jostle.

Money given to have a bet laid, not returned if not run.

All matches, bets, and engagements are void on the decease of either party, before determined.

An untried stallion or mare, is one whose produce has not started in public.

A maiden horse or mare, is one that has never won.

In estimating winnings, it is the practice to consider the clear sum gained only, and consequently to exempt the winner's stake. A winner of a sweepstakes of 20 gs. each (3 subs.), is therefore not disqualified from running for a 50*l.* plate, expressed to be for horses that never won a plate, match, or sweepstakes of that value.

A horse walking over or receiving forfeit, except for a match, to be deemed a winner.

In all nominations and entrances for stakes, subscriptions, and plates, of horses, &c. which have not started before the time of naming or entering, the sire, dam, and grandam of the horse, &c., named or entered, must be mentioned, if known, unless the dam has a name which is to be found in the Stud-Book or Racing Calendar; in which case the name of the sire and dam will be sufficient. If the horse, &c. named or entered be own brother or sister to any horse, &c. having a name in the Stud-Book or Racing Calendar, it will be sufficient to name it as such. If the dam or grandam be sister (but which sister must be specified, if there be more than one), or dam or grandam of any horse, &c. having a name in the Stud-Book or Racing Calendar, it will be sufficient to mention her as such. If the dam or grandam is not known, the sire of the

horse, &c. must be mentioned, together with such other particulars as will be sufficient to identify the animal. If a horse has once appeared in the Racing Calendar by a name, and his pedigree, it will be sufficient afterwards to mention him by his name only, even though he has never started. If the dam was covered by more than one stallion, the names of all of them must be mentioned.

If any horse shall be named or entered without being properly identified, he shall not be allowed to start in the race; but his owner shall be liable to pay the forfeit, or, if a play or pay race, the whole stake. All bets on a horse so disqualified for starting are void.

In case any objection to the qualification of a horse, on the ground of incorrect pedigree or nomination, be made before the race is run, the Stewards shall have the power of ordering that the settlement on such race shall be suspended until the objection shall have been investigated; but if any such objection be made after the race, it shall not affect the bets, which must go with the horse that comes in first, provided that he be of the right age, and not otherwise disqualified by the laws of racing.

No horse, though coming in first, shall be deemed the winner of any plate, match, or sweepstakes, whether handicap or otherwise, which shall be proved to have run, or to have continued to run, under a false description; and such disqualification shall remain in force until his proper pedigree shall be ascertained and recorded. But no such objection to the disqualification of a horse shall be received after the lapse of twelve months from the time of running.

In every sweepstakes in which there shall be any allowance of weight to the produce of untried horses

or mares, such allowance shall be claimed on the article by each subscriber before the expiration of the time of naming ; and if not so claimed, no allowance shall be made, even though the horse or mare should prove to have been untried at the time of naming.

All stakes for matches, subscriptions, and sweepstakes, to be made before the hour of starting for the first race of the day ; and in default thereof by any person, he shall pay the whole stake as a loser, whether his horse comes in first or not, unless such person shall have previously obtained the consent of the party or parties with whom he is engaged, to his not staking. But this rule is not to extend to bets, which are to be paid and received as if no such omission had happened.

No person shall start a horse, &c., either in his own name, or in that of any other person, unless both the owner and namer of such horse have paid all former stakes and forfeits ; and no horse shall be permitted to start for any race, unless all former stakes and forfeits due for that horse shall have been paid as above, provided an objection to such horse starting shall have been made by 10 o'clock in the evening preceding the day of running.

When a horse is sold with his engagements, the seller shall not have the power of striking the horse out of the engagements with which he was sold, and the original subscriber remains liable, in default of payment by the purchaser.

When a person takes a nomination for a stake, in which the forfeit is to be declared by a particular time, and does not declare by the time appointed, he shall be considered to have taken the engagement on himself, and his name shall be substituted for that of the original subscriber.

All stakes or bets, whether expressed to be in guineas or pounds, shall be paid in pounds sterling.

When the riders of any horses brought out to run for any race are called upon, by the person appointed to start them, to take their place for that purpose, the owner of every horse which comes to the post shall be considered as liable to pay his whole stake; and all bets respecting such horses shall be considered as pay or play bets.

If in running for any race one horse shall jostle or cross another, such horse, and every horse belonging to the same owner, or in which he shall have a share, running in the same race, shall be disqualified for winning the race, whether such jostle or cross happened by the swerving of the horse, or by the foul and careless riding of the jockey, or otherwise; and where one horse crosses the track of another next behind him, it shall be deemed a sufficient cause of complaint, even though he be a clear length or more before the horse whose track he crosses.

In naming or entering for any race where there shall be any particular conditions required as a qualification to start, it shall be sufficient if the horse were qualified at the expiration of the time allowed for naming or entering; and he shall not be disqualified by any thing which may happen after the expiration of that time, unless so specified in the article; and if any additional weight is to be carried by horses which have won one or more plate or races within the year, it shall be construed to mean the year of our Lord.

When the qualification of any horse is objected to, the owner must produce a certificate, or other proper document, before the race is run, to prove the qualification of the horse; and if he shall start his horse without so doing, the prize shall be withheld for a period to be fixed upon by the Stewards, on the expiration of which time, if the qualification be not proved to the satisfaction of the Stewards, he shall not be

entitled to the prize, though his horse shall have come in first, but it shall be given to the owner of the second horse. When the qualification of a horse is objected to after the race is over, the person making the objection must prove the disqualification.

Where two horses run a dead heat, and the parties agree to divide the plate or stakes equally, all bets between those two horses, or between either of them and the field, must be settled by the money betted being put together, and divided between the parties, in the same proportion as the stakes shall have been divided. If a bet be made on one of the horses that ran the dead heat against a horse that was beaten in the race, he who backed the horse that ran the dead heat wins half his bet. If the dead heat be the first event of a double bet, the bet shall be void.

No person can *run*, either in his own name or in the name of any other person, two horses of which he is wholly or in part the owner, for *any plate*. Doubts having arisen as to the true definition of the word "*plate*," the Stewards of the Jockey Club have decided, that where a sum of money is given to be run for, without any stake being made by the owners of the horses (entrance money not being considered a stake), such prize shall be construed to be *a plate:* but where a stake is deposited by the owners of the horses, which is to go to the winner, and an additional sum of money, or a cup, piece of plate, or other reward, is offered as a prize to the winner, even though such additions shall be denominated a plate by the donor, such race shall be deemed and taken to be a sweepstakes, and not a plate.

The stakeholder shall be allowed to retain, out of the stakes in his hands, the following fees for his trouble, viz.: —For every match one pound; for every plate, one pound; for every subscription or sweepstakes, where the whole stakes exceed 100*l*., and

do not amount to 1000*l.*, two pounds: when it amounts to 1000*l.*, five pounds.

All disputes, arising elsewhere than at Newmarket, which may be referred to the Stewards of the Jockey Club, must relate to horse racing, the facts must be reduced into writing, and be sent by, or with the sanction of, the Stewards of the races where the matter in question occurred, and the parties must agree, in writing, to abide by the decision of the Stewards of the Jockey Club. But at a meeting of the Jockey Club, on the 12th of October, 1842, it was unanimously resolved, that "the Jockey Club and the Stewards thereof will henceforth take no cognizance of any disputes or claims in respect to bets."

## CHAPTER V.

### DEMONSTRATIONS OF THE HORSE'S AGE.

"Never look a gift horse in the mouth."—*Stable Proverb.*

As a matter of civil economy, it is of importance to judge correctly of the age of our useful servant—the horse. This is chiefly accomplished by observing the natural changes which occur in his teeth, the periods at which they appear, are shed and replaced, and the alterations of their form and markings.

The teeth of most animals offer some criteria, from which their age can be estimated with more or less accuracy. Slave-dealers have from time immemorial regarded the appearances presented by the teeth of their victims as tests of their age; and recently, and in our own country, the same observation has been called into requisition, in order to carry out the intentions of the legislature in restricting the employment in factories of children under a certain age. The teeth are nearly the sole indices of the age of the horse, ass, elephant, camel, dog, and the polled varieties of the ox and sheep, while in other domesticated animals, as the elk, deer, goat, common ox and sheep, the horns also present legible indications of the progress of time.

Reference to the teeth to ascertain the horse's age is not by any means a practice of recent origin. Xenophon, in his well-known work on Horsemanship, alludes to it as an established custom used in the

selection of cavalry for the Grecian army: he properly advised a rejection of such horses who had lost the dental mark. The same facts are subsequently noticed by Varro, Vegetius, Columella, and other Roman writers.

The horse, when *full-mouthed*, possesses forty teeth—twenty in each jaw. They are named from their use, position, and character. Those in the front of the mouth, whose office it is to gather the food when grazing, are termed *incisors*, or, more appropriately, *nippers*. They are twelve in number, six above and below; they do not overlap each other, as is the case in man, but meet in a broad tabular surface. From these teeth is principally deduced the age of the animal. For the sake of description they are ranged in pairs, as they appear, and the first pair is called the *central*, the second the *dividers*, and the third the *corner* nippers. The *tushes* or *canines* come next, one above and below on each side. They are of a pointed shape, and are convex on the outer side and slightly concave on the inner surface. They scarcely ever appear above the gums in mares, although their rudiments may be discovered on dissection imbedded in the maxillary bones. They are consequently regarded as sexual distinctives. It is difficult to assign their use; their position precludes the possibility of their being used as weapons of offence or defence. They may be viewed as a link of uniformity so commonly traced in the animated world. The *grinders* or *molars* are twenty-four in number. They are teeth of great power. By them the food is comminuted, and prepared for the digestive action of the stomach. In order to fit them for their office, they possess additional interlayers of enamel, which prevent their too rapid wear. The arrangement and number of the horse's teeth may be represented by the subjoined *dental formula*.

Incisors, $\frac{6}{6}$; Canine, in the male only, $\frac{1}{1}$ $\frac{1}{1}$; Molars, $\frac{6}{6}$ $\frac{6}{6}$;=40. In common with most animals, the horse is provided with two sets of teeth: those appearing first are known as the *temporary*, *deciduous*, or *milk teeth*, and are succeeded by the *permanent set*. On comparing the different magnitude of the jaw-bones of the colt and the adult horse, the necessity of such a change is at once apparent. By it the teeth are adapted to the size of the maxillary bones. The teeth, from their peculiar character and mode of growth, do not admit of any material increase of dimension, and nature was therefore forced either to place the large permanent teeth in small and disproportionate jaw-bones, or to adapt the size of the teeth by displacement to the growth of the bones that contained them. The latter process is adopted, and constitutes one of those remarkable evidences of creative power with which the living frame is replete.

Three substances enter into the structure of the teeth: 1. the enamel; 2. the dental bone, or ivory; and, 3. a cortical envelope, surrounding the fang. The enamel differs but little in chemical constitution from the osseous body of the teeth, and that principally results from the absence of animal matter from it. It appears closely analogous to the univalve porcelainous shells, and is the hardest and most indestructible substance of the body. The dental bone is distinctly tubular in structure, as was first demonstrated by Leeuwenhoek, in a communication made by him to the "Philosophical Transactions" of 1678, and this has been confirmed by the late microscopical researches of Purkinje and Müller. These tubuli take a perpendicular direction, are extremely small, but capable of absorbing ink by capillary attraction. No such tubuli have been traced in the enamel. The teeth, both incisors and grinders, are being constantly worn away at the crown, but the loss is supplied by the gradual, continuous, and equivalent growth from the

root. The horse's teeth are sometimes, but not frequently, subject to disease. It is seldom that any of them are lost from age, as is the case with man, and most other animals.

There is some difficulty in estimating the natural average length of the horse's life, for many obstacles oppose an inquiry on a scale of sufficient magnitude to be satisfactory. The numerous evils entailed on him by the arduous labours, and the restricted and unnatural habits of a domesticated state, tend greatly to abbreviate life. After he is rendered prematurely decrepid, and unfit for further exertion, his course so generally terminates in the slaughter-house, that we are almost at a loss for examples to direct our inquiries. From these, and other reasons, it cannot be much doubted that his age is generally underrated. Horses are most erroneously called *aged* on the obliteration of "the mark" from the lower incisor teeth, which occurs by the completion of the eighth year, and though it is far from being the natural term of age and debility, or even of decline of the vital energies, it too frequently happens that, by that time, bodily infirmity has been prematurely induced by over-exertion of their powers, and they are "used up" to save expense, as the slang phrase designates this inhuman practice. Horses at twenty years old are often met with in cases where the least humanity has been bestowed on their management. Eclipse died at the age of twenty-five, Flying Childers at twenty-six. Burns's mare Maggie attained more than twenty-nine years.* Bucephalus, the cele-

* "It's now some nine-an'-twenty year,
Sin' thou was my guid father's meere;
He gied me thee, o' tocher clear,
An' fifty mark;
Tho' it was sma', 'twas weel-won gear,
An' thou was stark."

—*The Auld Farmer's New Year Morning Salutation to his Auld Mare Maggie.*

brated horse of Alexander of Macedon, lived till thirty. The natural term is probably between twenty-five and thirty years. A faint and uncertain guide is found in the register of the ages of some of our most celebrated racing stallions, recollecting, however, that several of them were destroyed on becoming useless for purposes of the Turf. The united ages of 93 of these horses amounted to 2005 years, or rather better than $21\frac{1}{2}$ years each horse. Professor Pessina estimates it at thirty years; Mr. Percival rather higher, and Cuvier from 30 to 40. Instances are frequently noticed of horses attaining the age of thirty-five, and Mr. Blaine mentions one which was attached to the Woolwich riding-school as being 40. Mr. Titchmarsh, of Kneesworth, Cambridgeshire, had a grey pony, which died in February, 1840, at the great age of 41 years. Culley, in his work *on Live Stock*, &c., mentions a horse which had received a ball in its neck at the battle of Preston (1715), and yet lived until the year 1758: if it be allowed to have been four or five years old at the time of receiving its wound, it must have been nearly 48 years old at its death. Pliny remarks that many horses attain the age of fifty years, but that mares do not live quite so long. It is most confidently asserted that a barge-horse belonging to the Mersey and Irwell canal company, attained the surprising term of sixty-two years. The Athenian chronicles record that a mule had reached the age of eighty; and, to terminate the list of equine Methuselahs, Rankin, in his *History of France* (vol. ii. p. 315.), cites Flodart, an old historian of that country, who asserts that, in the year 931, a horse had reached the truly patriarchal age of 100 years.

Blaine, in his *Outlines of the Veterinary Art*, (p. 40. 4th edition,) ingeniously draws the following comparison between the respective ages of man and the

horse. "The constitution of horses and man may be considered as in an equal degree of perfection and capability for exertion, or of debility and decay, according as youth or age preponderate. Thus, the first five years of a horse may be considered as equivalent to the first twenty in man; or thus, that a horse of five years may be comparatively considered as old as a man of twenty; a horse of ten years as a man of forty; a horse of fifteen as a man of fifty; a horse of twenty as a man of sixty; of twenty-five as a man of seventy; of thirty as a man of eighty; of thirty-five as a man of ninety. So far from this comparison being in favour of the horse, I am disposed to think it is too little. Horses of thirty-five years of age are as common as men of ninety, provided it be taken into account that there are twenty human subjects for every horse; and, unquestionably, a horse of forty-five is less rare than a man of a hundred and ten."

When the foal first makes its entry into the world, the only teeth found above the surface of the gums are the first and second pairs of molars or grinders, but within a few days' time, generally about a week, the first pair of the lower nippers make their appearance, and, at their first exit from the gum, seem to occupy nearly the whole front of the jaw, and would, by their length of surface, appear to preclude the possibility of there being any room left for the others. The corresponding pair in the upper jaw are not seen until a few days subsequently. The appearance of similar pairs, or companion teeth, in either jaw, is never exactly synchronous, for, throughout all the mammalia, the lower teeth are found to protrude a short time before those of the upper jaw. On estimating the great danger from irritation which often occurs in children when cutting their teeth, this natural ordinance cannot but be regarded as a most

wise means of guarding the life of the young animal, for, were the two pair to be each causing constitutional derangement at the same time, the consequences would be much more frequently fatal.

By the end of the first month, another, or third molar has been put up, and before six weeks' time has expired, a second pair of incisors.

The third pair, or corner nippers, make their appearance soon after the sixth month, and, by the completion of the year, the fourth pair of molars have generally arisen.

It now becomes necessary to offer a description of what is technically termed "*the mark*," as, from this time forward, it presents demonstrations of the animal's age, of great value to the horseman. When the incisor teeth first appear above the gum their faces are not tabular and smooth, but they have the outer edge much more elevated than the inner one, in consequence of an apparent doubling of the enamel surrounding the body of the teeth, and then dipping in towards the centre.* This inflection of the enamel is higher and stronger in the front portion of the tooth than it is in the part presented towards the tongue, but both edges are more elevated than the central portion of the tooth, and thus produce a concavity or *fossula* in the middle of the tooth's face, which, being removed from attrition, becomes, in the course of a short time, nearly black, and then

* "In the horse, these teeth, which are termed nippers, do not cross, but meet; consequently, in the grinding of the food by the back teeth, these teeth are rubbing against one another, and are thus subject to very great wear. To enable them to resist this, they have an additional plate of enamel running down the centre, and when the prolongation of the sac which was sent in to secrete the enamel is taken away, a hole is necessarily left in the tooth, which, being filled up with particles of the animal's food and other foreign matter, is usually of a dark colour. This is termed by jockeys the mark, and they judge of a horse's age by it, as, of course, when the tooth is ground down the mark disappears."—*Lord's Popular Physiology*, p. 56.

resembles very closely, in shape and colour, the black eye of a broad bean. It is important to bear in mind that what is called the mark is not simply *a mark* or *discoloration*, but a distinct concavity in the centre of the tooth. Discolorations exist on the face of the tooth long after the disappearance of the true mark, and would seem to be caused by the varying density of the surface permitting the absorption of the vegetable juices in some places, and resisting it in others. Shortly, however, the elevated rim of enamel gives evidence of the almost constant friction to which it is submitted, and wearing gradually down, obliterates, in its course, the central black concavity or mark, and produces a flat and even face to the tooth. This result is erroneously termed by dealers "the filling up of the teeth," when, in fact, it is the effect of their being worn down. As the times occupied to wear out these natural markings of the teeth, though slow, is usually pretty uniform, they present legible traces of the march of time, and afford a valuable opportunity of ascertaining the number of years the animal has existed.

*Thus, the yearling's mouth* is usually possessed of $\frac{6}{6}$ temporary incisors and $\frac{4}{4}\,\frac{4}{4}$ molars, and the mark is nearly perfect in the corner nippers, rather less so in the dividers, and almost obliterated from the central ones; giving plain evidence of the advance of time by the progress and effect of detrition.

By an enactment of the Jockey Club, the age of horses competing for stakes on the turf is to be reckoned from the first of January, but the more common as well as the more natural custom is to take May-day as the birthday of the horse, and to calculate his age from that date. On this day, every year, it is customary in some places to decorate the horses' bridles with ribbons or flowers in commemoration of the event; something in accordance to the ancient

festivals of Hippocratia of the Arcadians and Consualia of the Romans, when horses and mules rested and had their heads crowned with chaplets of flowers.

*At two years old* the only additional appearance is that of another or fifth molar and the dental formulary is — incisors $\frac{6}{6}$, molars $\frac{5}{5}$ $\frac{5}{5}$. This addition might be readily overlooked from the hidden position of the molars, and indeed reference is but rarely made to them as demonstrators of the age, for we have it at once offered by the changed appearance which the nippers now present. At this period the corner incisors still possess some portion of the mark; but it is much shorter than at the first appearance of the tooth; it is but faintly discernible in the dividers, and is quite obliterated from the central pair. In addition, the teeth appear much worn down, particularly the central ones, and they are evidently becoming disproportionally small for the size of the mouth; they take also a separated or divided character, the spaces between them becoming more and more distinct, gradually preparing for the important changes which are soon to take place. About the completion of the second year the first of the series of displacements commences, and by the uniformity of nature's operations it occurs in those which were the first seen above the gum, — that is, the most forwardly situated pair of grinders. These changes are brought about by the removal by absorption of the fangs of the temporary teeth, and by the upward pressure of the bodies of the permanent ones. As the place occupied by the last set is not exactly the same as that in which the milk teeth were placed, but usually a little aside, in order to accommodate themselves to the enlarged figure the mouth has by this age assumed, it sometimes happens that the milk teeth are not thrust out, but remain standing by the side of the permanent ones, and often do considerable injury to the lining membrane

of the cheeks and obstruct the performance of mastication. The usual name given to them is that of *wolves' teeth*, and their existence may be suspected whenever the young and otherwise healthy animal evinces a disinclination to its food or a difficulty of eating it. They should be removed by mechanical assistance as soon as discovered.

Between the completion of the second year and the advent of the third, other important changes take place. The sixth or last molar makes its appearance, and, far more important to the subject under consideration, the central pairs of temporary nippers are now thrust out and succeeded by the permanent ones. This last change usually occurs at the age of two and a half years. Interested parties sometimes endeavour to accelerate or retard this natural event. Thus it is often the aim of dealers to increase the apparent age of their colts by accelerating the teething process; and in early foaled colts they are able to accomplish this by good feeding, and by removing those temporary teeth, whose position they are anxious to see occupied by the permanent ones, so as to take away all impediment to their appearance. By these nefarious practices they sometimes succeed in rendering a colt apparently a year older than he really is, and so add materially to their own gains. Again, in competing on the turf for valuable stakes or the more important results of the betting-book, endeavours have often been made, by taking opposite measures to those before pursued, selecting such as have been foaled late in the season, to give to the colt or filly a less apparent age than it truly possesses. In all cases of this description, reference should always be made to the molars, as their changes are least understood, and they are less likely, from their position, to have been tampered with.

The last three in each row of the molar teeth,

those most remotely situated, are not deciduous like the three most anteriorly placed.

*The three-year-old mouth.*

Incisors. { Temporary $\frac{4}{4}$ / Permanent $\frac{2}{2}$

Molars. { Temporary $\frac{2}{2}$ $\frac{2}{2}$ / Permanent $\frac{4}{4}$ $\frac{4}{4}$

The second pair of temporary molars are shed soon after the termination of the third year; and at about three and a half years another pair of incisive teeth, the dividers, are replaced by permanent ones. Toward the end of the fourth year the tushes sometimes show themselves above the gums' surface, but more generally their appearance is delayed until the beginning of the fifth year.

*The state of the mouth at the completion of the fourth year* will consequently be:

Incisors. { Temporary $\frac{2}{2}$ / Permanent $\frac{4}{4}$

Canine, scarcely perceptible, $\frac{1}{1}$ $\frac{1}{1}$

Molars. { Temporary $\frac{1}{1}$ $\frac{1}{1}$ / Permanent $\frac{5}{5}$ $\frac{5}{5}$

At the commencement of the fifth year the third and last pair of the temporary molars are shed and replaced; and as time progresses and the animal attains four years and a half, the last remaining pair of temporary incisors, the corner ones, are followed by their permanent successors. This last change terminates the teething process. The canines or tushes have by the end of the year attained nearly one half an inch in height. The tushes, like the last three grinders, are not shed. By this time the mouth is distinguished by the appellative of *full* or

complete, being nearly perfect. The young animal, which hitherto had borne the name of colt or filly, takes that of horse or mare, according to sex.

*The full mouth of a five year old* will be possessed of none but permanent teeth.

Incisors, permanent $\frac{6}{6}$; canine $\frac{1}{1}$ $\frac{1}{1}$; molars, permanent $\frac{6}{6}$ $\frac{6}{6}$.

Up to the end of the fifth year the age is judged of, as has been shown, by the appearance, disappearance, and replacement of the various teeth; but now that the teething process is finished, recourse is had solely to the marks which the incisors bear on their upper surface.

*At six years old* the two central nippers, in the under row, have lost the mark which was plainly discernible in them all on the completion of the fifth year. As the incisive teeth appeared at intervals of a year from each other, so also does the obliteration of the mark follow the same ratio of time, it taking nearly three years from the first exit of each tooth from the gum to the complete wearing out of the black fossula from its face. Thus the central pair of incisors, which were put up towards the end of the third year, lose their mark by the attainment of the sixth; and those pairs which appeared in the fourth and fifth years retain their markings until the seventh and eighth years respectively. The only difference between a five year old and a six year old mouth is, that in the former the tushes and the corner nippers have a dwarfish appearance, and all the nippers possess their marks, and in the latter the tushes have attained their full length (about an inch), the corner nippers are on a level with their companions, and the mark has disappeared from the central pair.

*At seven years* the progressive detrition has obliterated the mark from the two dividers, in addition to that which had before taken place from the central

pair, and the only remaining marks to be seen are those of the corner teeth. The lanceolate shape of the tushes is somewhat modified; they have now become less pointed than they were a year ago, and their edges are evidently much more rounded.

*When the eighth year is complete*, the mark is effaced from all the lower nippers, and the animal is most inappropriately styled "aged" in stable parlance. At this period the dishonest practice designated *bishoping* is sometimes resorted to in order to simulate the marks characterising youth. The horse is cast and the head fixed for the convenience of the operator. A portion of the centre of the tooth is chased out with a graver's tool, and, by the application of a heated iron, the scratches of the instrument are burnt out, and a black mark left in its place. Thus, by treating in this way the two corner nippers they convert the horse, let him be ever so advanced in years, apparently into a seven-year old. These manipulations are readily discoverable by the practised eye, for the hot iron leaves a yellow stain around the edge of the mark, which does not exist naturally.

After the obliteration of the mark from the lower nippers, many horsemen advert to the progressive alterations in the shape of the tushes, or canine teeth. These appearances are sometimes of great assistance, and long habit enables the examiner *to guess*, with some approximation to correctness, the true age of the animal: still, the indications they offer form a very fallible guide, and one on which reliance cannot in many cases be placed. These teeth are not concerned in mastication, and though exposed to little wear, yet they undergo a gradual and perceptible alteration in figure. At six years they are fully developed, their shape is lanceolate, being also convex on the outer side, and channelled on the inner surface. As time advances their shape alters. The points are

worn away, and, by passing the finger round the inner surface of the tooth, we perceive that the channel no longer exists; the edges are lost, and it gradually assumes a cylindrical appearance. In declining years they frequently evince a tendency to reverse their pristine form, for instead of being largest at the base, that part is smaller in circumference than the apex.

After the marks are effaced from the lower nippers, at eight years, reference is usually made to those of the upper row, for they invariably retain them some years longer. The cause of this may be either attributed to an original deeper indentation of the marks, or to a diminished wear of the teeth themselves. Yet the period of disappearance of the marks, so uniform and regular in the lower teeth, is not by any means definite or certain in the upper ones; and, as a criterion of age, they are consequently deprived of a chief portion of their value. Experience has, however, substantiated that the medium, as well as the most general terms of their disappearance, is from the two central teeth at some period between the ninth and tenth years; from the next pair, between the tenth and eleventh years; and from the corner ones, between the eleventh and twelfth years.

The continental veterinarians endeavour to estimate the age up to the remotest periods of life. To accomplish this, they again refer to the nippers, and seek to gain intelligence of the progress of time by the successive alterations in the shape of their wearing surfaces. The outline, at first oval or ovoid, imperceptibly approximates to the circular, and that figure is by degrees metamorphosed into the triangular. Such observations, though correctly founded, cannot, from the vagueness which must always attend the changes of form, ever be of any practical value. A far more important indication of advancing age is presented in the manner in which the two rows

meet each other. Early in life, at the completion of the teething process, the upper and lower nippers meet each other in a perfectly perpendicular direction; but as time advances this vertical position is by degrees lost, and gradually changed to an angular one, by a forward projection of the wearing surfaces or ends of the teeth, the angle becoming more and more acute with the increase of age. The lower row of teeth contributes most to this angularity of outline, for it appears to exceed the other in the rapidity with which it takes this direction, so that the lower corner nipper, by projecting forwards rather more than the upper one, wears a notch in its face by leaving the most posterior part untouched. So marked is the dental angle formed by the approximation of the two rows of teeth in old horses, that it is surprising it has been so long overlooked by veterinary writers. To the novice in horseflesh it offers by far the most readily acquired, as well as the most enduring clue to the animal's age.*

Other proofs of advanced age are to be discovered in the general senile look of the animal; but it must be remembered that horses got by old stallions and out of aged brood mares show the external symptoms of age sooner than those bred from young parents; grey hairs make their appearance about the eye-brows and muzzle, and should the horse have been of a grey colour, that colour gradually assumes a lighter tint, and approaches more and more with the advance of age to a perfect white. The bars, as the waved appearance of the lining membrane of the mouth is designated, are less distinctly prominent; there is an increase in the hollowness over the eyes, and the lips

* *An instrument to measure the age of horses* might easily be constructed. All that would be necessary would be to ascertain by a course of experiments the average angularity of the teeth at different specified ages, and graduate the instrument for taking the angles accordingly.

become thinner in substance and much more pendulous. Nature, in order to support the declining powers, removes by absorption a great portion of unnecessary and diseased structures, giving a more prominent appearance to the joints, withers, and other bony processes, and frequently taking up wind-galls, splents, and spavins of long standing.

## CHAPTER VI.

### VETERINARY JURISPRUDENCE.

" He that by injury is griev'd,
And goes to law to get reliev'd,
Is sillier than a sottish drouse,
Who, when a thief had robb'd his house
Applies himself to cunning men,
To help him to his goods again;
When all he can expect to gain.
Is but to squander more in vain."—BUTLER.

IT has been justly remarked that lawsuits originate less frequently in the positive dishonesty and bad faith of the litigants, than in their gross misconception of each other's rights and liabilities. If it were possible to define with accuracy the distinction between the soundness and unsoundness of horses—to show what constitutes the one and what the other—where soundness terminates, and the converse, unsoundness, begins, and to place a broad line of demarcation betwixt the two, then would a great amount of empty cavil and hurtful litigation be henceforth avoided. But although it may not be possible to prevent all conflict of opinion or interest, yet I think it is in the power of veterinarians to obviate a chief portion of those disgraceful exhibitions which so frequently occur in our courts of law in horse causes, to their own disparagement and public disgrace. To attain this desirable end, some attempt should be made by the teachers at the different veterinary schools to come to an understanding on the subject, grounded on physiological and patho-

logical principles, instead of leaving it, as at present, to the undirected energy of the student. A few lectures on veterinary jurisprudence, delivered by competent persons, would tend much to create a unison of professional opinion, and, as a consequence, to increase the public respect for the members of the veterinary institutions.

From the uncertainty of the exact meaning of the term "unsound" has arisen a mass of legal contention. Scarcely two persons entertain the same idea of it; lawyers, veterinary surgeons, farriers, horse dealers, horsemen, sportsmen, and jurymen, each, and every one, hold different and conflicting notions about "drawing the line." If "unsoundness" is to express total absence of disease or bodily imperfection, without regard to utility, as some contend, then but few horses will fully warrant the application of the term to them. Others hold, that "alterations of structure, attended with interruption or impairment in function, constitute unsoundness." Mr. Stewart is yet closer to the mark when he defines "a horse to be sound when there is no disease about any part of him that renders, or is likely in future to render, him less useful than he would be without it." Among the most remarkable of recorded opinions stands that of the late Lord Ellenborough, who thought, and laid it down as an invariable criterion, that a horse costing more than ten pounds was consequently sound. However well this might have satisfied the lawyers of his day, the horsemen of ours are not content that price should constitute soundness. A poetical veterinarian of the good old school has defined soundness in the following Hudibrastic lines:—

"When may a horse be called sound?
When no disease upon't be found,
When neither blind, nor broken-winded,
Nor lameness—just begun or mended,
Nor any cause at time of sale,
That 'gainst his duties may prevail."

Now, in homely prose, I do think that many more exceptionable definitions than this are to be found; and if maxims were of importance, this might serve as a rough guide or remembrancer. Some there are who require so many perfections in the animal, that the sound horse, according to their construction, would be a matter of curiosity: among these fastidious censors is Taplin, who thinks it requisite that the horse should possess "a perfect state of both the frame and bodily health, without exception or ambiguity, the total absence of blemishes as well as defects; a freedom from every imperfection, and from all impediments to sight and action." It will at once be apparent, from the extreme rarity of the above description of animal, that by far the greater portion of useful horses would be unjustifiably condemned, and rejected as unsound and unsaleable. This writer, together with many others, appears evidently to have taken the word "unsound" in its general meaning, and have amused themselves by giving definitions of it. But however well these definitions may be calculated to elucidate the precise signification of this word, we are not at all justified in appropriating it to the imperfections of the horse. It is not necessary to soundness that a horse should be absolutely free from every trifling disease, or of the most faultless anatomical construction. Blemishes cannot, certainly, of themselves, justify a rejection, for horses are often not an iota the less serviceable for many blemishes. Neither can malformation be argued to constitute unsoundness, for there are very few horses of unexceptionable mould. We often see them with upright and loaded shoulders, and other deviations from the model assumed to be perfect; yet, though these may constitute defects, they are not necessarily of themselves a source of unsoundness. To condemn a horse, because he

deviated slightly in structure from the standard of perfection, would be unwarrantable. The structural change, though not partial, should be of sufficient importance to interfere with the functions of the whole before we are justified in rejection. We must attach to the word "soundness" nothing more than a present and prospective fitness or capability of performing duty, without regard to age, blemishes, or conformation. *A horse is sound, provided there be not a total or partial loss of function, preventing, or calculated to prevent, the animal from performing the ordinary duties of a horse of his class.* The principal question to be taken into consideration is,—Does, or will the deviation from the normal condition, incapacitate the animal from rendering to the owner the usually required quantity of labour, at the same time bearing in mind the order or class to which the horse belongs? for there are some functional deviations from the natural standard constituting unsoundness, or unfitness for one description of employment or labour, which would not be held objective or detrimental in other kinds. For example, a modification of structure and function which would unfit a race-horse, a hunter, a hack, a charger, or a carriage horse for his duty, might not in the least impair the utility of a farm-horse, a cart-horse, or a dray-horse.

The application of the views taken above to those subjects on which litigation most frequently occurs, will serve to test the utility of the definition; for unless it will apply, with equal facility, to the minor bodily affections, as to the more decided and violent diseases, it is useless.

At the head of the list stand those abnormal conditions of the bones, occurring in different parts of the body, and named, sometimes from caprice, at others from situation. The notice given to each lesion is necessarily brief, but a more full detail of the diseased

structures, and their probable consequence, will be found under their respective headings in the latter portion of this work.*

"*Splint or Splent.*—This is a disease from which very few horses are exempt. Disputes have frequently arisen whether a splint constitutes unsoundness. A correct knowledge of the anatomy of the parts liable to this affection is necessary in deciding the point. It must entirely depend on its situation. If contiguous to the ligaments of the knee-joint, or placed so as to interfere with the action of the flexor tendons or suspensory ligament, it will decidedly cause lameness, and ultimately prevent the animal from labour. Sometimes, when of considerable size, it is struck by the opposite foot, which produces inflammation of the part, pain, and lameness. It would be perfectly ridiculous to reject every horse that has a splint.

"*Spavin.*—Although a horse may occasionally go well, and still possess bony enlargements of his hocks, yet, in the majority of instances, there cannot be a moment's hesitation in deciding this affection to be unsoundness.

"*Ossification of the lateral Cartilages of the Foot*, when existing in any considerable degree, is decidedly an unsoundness, and even in slighter cases there must exist a predisposition to farther disease, which ought always to be taken into consideration. The same remarks apply to *Ring-bone*, which is calculated to deprive the horse of a very important joint.

"*Anchylosis of the Vertebræ*, is manifested by backing the horse, when there is evident straddling or reeling motion of the hind extremities. Horses so affected seldom lie down. As it is calculated to prevent the

* The subjoined description is taken, with little alteration, from a short essay "*On the Causes which constitute Unsoundness in Horses*," read by the author of this volume before the London Veterinary Medical Society, in 1836.

animal from performing his ordinary duties, it is an unsoundness.

"*Curb.*—Curb is the result of an instantaneous strain, and therefore if sprung at the shortest time subsequent to sale, does not render the animal returnable in consequence of it. The inflammation which generally follows its advent may subside, and little remain to discover the matter; but a horse who has once thrown a curb, is obnoxious to a repetition of the same affection ever afterwards. Mr. Coleman relates an anecdote exemplifying the general ignorance of lawyers and the public, on subjects relative to horses. The learned counsel, Mr. Erskine, in addressing a jury in a horse cause, said, 'Horse causes are generally very tedious; yet the one now before them would not occupy much of their time, as he could easily show that the horse was rotten at the time of sale, for the leg was swelled up to the hock, and the hock in the horse corresponds to the knee in man; and if our legs were to swell up to our knees as in dropsy, we should stand but a very poor chance.' The judge and jury fully concurred with the mock sagacity of this remark, and the plaintiff very unjustly got a verdict in his favour.

"*Windgalls, and other Bursal Enlargements.*—These are so many certain indications of hard work, but not, assuredly, convincing proofs of unsoundness. They often exist without the least apparent inconvenience to the animal.

"*Capped Hock* arises from contusions on the point of the os-calcis. It is certainly a dis-sight, but not an unsoundness.

"*Contraction of the Hoof*, from its not always incapacitating the horse, must be ranked according to its degree or severity. Some horses work constantly with an upright narrowed foot with apparent ease and durability. It must entirely depend upon the

degree of contraction which has taken place, and it requires a person of observation, and well acquainted with the subject, to decide upon the probability of its rendering the animal incapable of labour.

"*Corns* do not generally prevent the ordinary occupations of the horse. Much, of course, depends upon the state and appearance of the corn; but I am almost persuaded that, in the majority of instances, I should reject a horse with a corn or corns as unsound, because calculated at some period to deteriorate the natural usefulness of the animal.

"*Sand-crack.*—A horse with a sand-crack should be rejected before purchase, for it cannot be returned solely in consequence of possessing one after the transfer is complete, for the rule '*caveat emptor*' applies in this case; for if the horse is purchased without necessary ordinary inspection, the buyer deserves to be the loser.

"*Neurotomy.*—No unprejudiced mind will be held long in hesitation as to the classing of horses who have undergone this operation; they are decidedly unsound. The operation was performed to alleviate pain, the effect of disease, and, however well it may have succeeded, cannot be trusted for any length of time.

"*Broken Knees, Wounds from Cutting, &c.*—None of these constitute sufficient grounds for rejection, provided they do not interfere with the usefulness of the horse.

"*Cough.*—A slight recent cough is a temporary unsoundness, for the animal cannot be said to be able, while labouring under cough, to accomplish the same portion of work with equal facility as when free from it. In order lawfully to be able to return a horse for cough, it must be proved to have existed prior to purchase, for very slight exciting causes, such as change of stabling, dusty food, are sometimes sufficient to produce it.

"*Thick and broken Wind.*—Either of these diseases, which are only a modification of each other, renders the animal decidedly unsound.

"*Roaring.*—A decided roarer cannot be a sound horse. It is distressing to the horse, and a continual annoyance to the owner. This affection exists in a milder form, under the appellation of 'whistling.' Roaring may generally be discovered by the common stable trick of turning the horse quickly round in the stall, or by unexpectedly striking or pretending to strike, the horse's flanks; but these measures sometimes fail to elicit it, even when existing to a considerable degree, and frequently produce a grunt from horses that never roar at other times. In suspected cases, suddenly checking the animal when galloping will, when other means fail, render roaring audible, should the horse be so affected. But, of course, the efficacy of this and other means depends much on the seat of the disease.

"*Blindness.*—The lawyers have decided that horse-dealers are at liberty to sell blind horses as sound. They say any man, by taking usual precaution and care in examining the object intended to be purchased, ought to satisfy himself upon so evident a matter. But veterinarians know well enough that many cases of incipient cataract and amaurosis may be readily overlooked, and often require a very keen examination to discover their existence.

"*Spring-halt.*—Various opinions are abroad as to the seat and origin of this nervous affection. We shall not enter into that question here, for the fact is, that horses who possess it are not rendered less useful. Exercise almost always decreases it, and, forming no impediment to labour, it cannot be classed as a disease amounting to unsoundness.

"*Crib-biting.*—Professor Coleman used to remark, that a horse with this disease may be 'sound or un-

sound; it depends entirely upon the degree; and science can alone determine it. To say that every horse is unsound that bites a piece of wood is ridiculous.' Judge Burroughs entertained nearly the same opinion. This habit, consisting in efforts to swallow air, cannot exist long without detriment to the animal functions. Its continuance destroys the tone of the stomach, impairs the digestive power, debilitates the animal, and ultimately decreases his efficiency; consequently crib-biting in all stages is unsoundness.

"*Quidding* is the result of considerable tenderness of the mouth and pharynx, and is therefore a temporary cause of unsoundness, being calculated to render the animal incapable of active work.

"*Loss of a jugular vein* has repeatedly been made the matter of legal contention. It is a fact that some horses who happen to be deprived of one of these veins work during the rest of their lives without apparent inconvenience; still there is danger, as it predisposes to staggers and other head affections. When horses who have lost one of these veins are turned to graze, the blood is apt to accumulate about the head, from the difficulty of its return to the heart, consequent on the obliteration of one of the chief channels for that purpose. In such cases the vessels of the brain become engorged with blood, there is even intumescence of the side of the head and face, and the animal evinces undoubted symptoms of cerebral pressure. Such being the frequent effect of this defect, it must always be regarded with suspicion, and generally as a direct source of unsoundness.

"*Examination.*—There are a few hints as to examination which may possibly be of service to the horse-purchaser. A person inexperienced in the mysteries of horse-dealing, when about to purchase a horse,

will always find it to his advantage to secure the opinion of a professional veterinarian, whose office it is to guard his employer against imposition, and to point out any imperfections, blemishes, and sources of unsoundness that might probably be too obscure to attract the attention of one unpractised in the subject. Such assistance is not, however, always available; and in these cases the following hints may be of some utility. In the first place, examination, to be efficient and satisfactory, must be performed *nec temere nec timide*. The horse should be first rested (supposing him to be brought for approval), as there are more than one sort of lameness which become less apparent after exercise. Therefore it is always advisable to take this precautionary measure, particularly as we have sometimes some very cunning men to deal with — persons acquainted with the science of imposition in all its various ramifications. In the stable it is that the horse discovers himself a crib-biter, if possessed of that injurious habit. There he also *points* or favours, by relieving from all pressure, such a member as may be diseasedly affected; and attention is at once directed to the suffering part from the position which he assumes. Some dishonest dealers, aware of this fact, are in the habit, when purchasers are expected, of taking the round of their stables, and giving a sharp stroke of the whip to such horses as favour a diseased leg: this is technically called 'waking,' and it answers a double purpose — of hiding imperfections of the legs and feet, and giving a fictitious semblance of spirit when again viewed, from an anticipation of a repetition of the 'waking.' Stiffness of the hock, and other more important deviations from the healthy state in this important joint, are rendered perceptible by moving the horse from one side of the stall to the other.

"After having allowed the animal to rest for half

an hour, let him be trotted in the slowest manner possible upon a hard road, (paved, if convenient,) suffering the horse to have nearly the whole length of the bridle-rein or halter to himself, so as to leave the head at liberty to suit itself to his motions; and, should the fore-feet be affected, it will at once be evident by the up-and-down movement of the head, and by the different degrees of force with which the feet are placed on the ground. Should the hind extremities be the seat of lameness, the motion of the head will not be so good a guide; but it will reveal itself by the very apparent effort made by the animal to throw the weight from the affected to the sound limb; and that member is the source of pain which is placed most carefully and softly upon the ground, and which remains the shortest time on it: so that the force with which the foot of the diseased limb descends to the road, and the time it is suffered to remain on it, are both diminished; and the pace is so devoid of its natural regularity and cadence, that a practised person can frequently detect lamenesses, and very slight ones too, by the ear alone. The feet are examined in order to detect the existence of contraction, sole-founder, sand-crack, thrushes, or corns. The last can only be detected by removing the shoe; and it will be proper to do so if there is good reason to suspect their existence. Corns are found most commonly in horses that have weak and low heels. Their position is at the posterior part of the sole, near the junction of the hoof with the bars; and their existence is demonstrated by the horn of the part showing discoloration of blood when cut away by the drawing knife. They are frequently the effect of improper shoeing. The flexing part of the fetlock is sometimes the seat of ulcerated cracks, which are very painful during their continuance, and evince a weakness of circulation and constitutional debility.

The inner side of the fetlock-joints is looked to in order to ascertain if the horse cuts; these blemishes are readily discoverable. Should he cut from too high action — the speedy cut — the inside of the knee is the part injured. Splints are so commonly the lot of horses, that few are entirely without them. An opinion as to their harmlessness, or the contrary, will be influenced by their position and size. They are easily perceptible, even to the tyro in horse matters, in passing the hand down the leg. Little attention is paid to them if they are small, and not immediately below the knee-joint, or projecting backwards so as to interfere with the action of the back sinew or suspensory ligament. The eye soon learns to detect such departures from the natural state of the legs as spring from old strains, callosities, wind-galls, and improper position of the leg bones as regards each other, giving rise to standing-over at the fetlocks behind, and grogginess in the fore-legs. If the tendon or back sinew can be traced distinctly from the cannon bone, and free from any enlargement, if, on a side view, the leg be more flat than round, clean throughout, and of the natural perpendicularity, it may be regarded as sound. But should the legs be bent, the joints tumefied and callous, the tendon thickened and round, in any part or throughout the whole of its course, inferences unfavourable to the soundness of the animal must be drawn. The hocks are searched for curbs and spavins. The first are more readily to be seen by viewing the hock sidewise; and the latter by regarding it from before or behind. If the motion of the flanks is too laboured or unnaturally frequent, the healthiness of the lungs may be doubted. But as there are many gradations of disease of these important organs, the slightest of which are not always indicated by the working of the flanks, some other criterion must be

resorted to. This is found in the common practice of coughing the horse by squeezing the top of the windpipe, and observing the character of the cough. This test is by no means a bad one, though certainly not infallible. If the lungs are seriously affected, the cough will be short, dry, husky, and *timid*, if it may be so expressed; the animal fearing, as it were, to cough in the healthy sonorous manner. The best situation for examining the eyes is just within the door of a dark stable, allowing the external light to fall full on the eye; when the slightest opacity of the cornea in ophthalmia, of the crystalline lens or its capsule in cataract, may be readily discerned. By alternately shading and admitting light to the eye, at the same time watching carefully its effect on the pupil, to see if any or no corresponding dilatation and contraction takes place, we are enabled to judge of the presence of paralysis of the optic nerve in *gutta serena*. In addition, it is usual and necessary to ascertain if the horse has lost a vein, or whether he bears the marks of frequent bleedings, of setons, rowels, or the firing iron.

"*Vices.*—Vices are not unsoundnesses, and therefore require a special warranty. A horse warranted sound, without any allusion being made to his freedom from vice, and afterwards found vicious, would not be returnable on that account. The most common vices in harness are, *kicking*, *jibbing*, and *running away;* a warranty declaring a horse 'quiet to drive,' or 'quiet in harness,' would fully meet these points. *Restiveness* is frequently more the fault of the rider or driver than the animal. *Shying* is most often caused by some imperfection of the visual organs, giving rise to distorted appearances of objects on the retina. It is generally most frequent after sunset towards dusk. Horses who shy should never be beat for it, but treated with kindness and firmness.

Violence increases the evil instead of diminishing it. In such cases, Xenophon sagaciously remarks, that 'those who drive horses forward with blows inspire them with greater terror. For they suppose that when they suffer any injury in such a situation the suspected object is the cause of it.'

"It is said that a horse that has been bishopped is returnable, from the fact of fraudulent measures having been adopted to procure the sale.

"*Purchase, warranty, &c.*—Words do not constitute a bargain. A purchase is not legal unless earnest-money, as it is termed, be passed from the buyer to the seller, in order to ratify the bargain. From that period the horse belongs to the buyer, who is liable to all accidents. A written agreement may be used, and then there is no necessity for money to pass. In that case it must be signed by both parties concerned, or their agents acting for them. A groom or servant, acting as agent for his master, can give a warrant, which is as binding on the employer as it would have been if given by himself. A promise of warranty stands for nought in the eyes of the law. Warranties, to be effective, must be written, and on which the names of both contracting parties must appear. The usual form of warranty is subjoined, drawn on the receipt stamp equivalent to the sum paid for the horse.

London, May 20th, 1845.

Received of Mr. A. B. the sum of Fifty Pounds, Ten Shillings, for a bay mare, which is hereby warranted sound, and quiet to drive.

£50 10*s*. (Signed) C. D.

It is necessary, in order to return a horse for breach of warranty, or unsoundness, that the purchaser be able to prove the existence of the disease, or its

seeds, at the time of sale. Should the dealer refuse to take the animal in, on its being presented at his house or stables, he is liable, should he be wrong, to all cost for keep, &c. for the whole time after its being tendered. The horse, when returned, should be quite as valuable in all respects (excepting the cause or causes for which he is returned) as when bought. The purchaser on warranty, as decided by Lord Eldon, in the case of Curtis *v.* Hannay, is at liberty to bring his action for the deterioration in value caused by the unsoundness, without returning the horse. Lord Loughborough was also of the same opinion. He observed, "Where there is an express warranty, the warrantor undertakes that it is true at the time of making it. If a horse which is warranted sound at the time of sale be proved to have been at that time unsound, it is not necessary that he should be returned to the seller. No length of time elapsed after the sale will alter the nature of a contract originally false, neither is notice necessary to be given; though the not giving notice will be a strong presumption against the buyer, that the horse, at the time of sale, had not the defect complained of, and will make the proof on his part much more difficult. The bargain is complete, and if it be fraudulent on the part of the seller, he will be liable to the buyer in damages without either a return or notice." Should the purchase be made without a warranty, the buyer, provided he is able to prove the dealer's previous knowledge of any defect, can prosecute for fraud, unless the imperfection should be of such a glaring character as to be evident to the most casual observer. This is evidently a ridiculous distinction, justifying, as it does, direct and open robbery. Some have urged, as an excuse for this anomaly of the law, that the legal professors could not entirely divest themselves of the *esprit de corps*

or fellow-feeling, for their brother sharp practitioners —the copers in horse-flesh.

By a statute of the 12th of Henry VIII., any man might seize upon horses depasturing commons if they were under a certain size. This was probably enacted with the view to discourage the propagation of small horses. It remains, I believe, still unrepealed.

At common law, if a person keep glandered horses in his stable so near to that of another as to convey the infection, he is liable to an action. (*Chitty's General Practice*, p. 606.)

"Horse-stealing was formerly a capital offence, punishable by death, but it is now commuted to transportation. The maliciously wounding, maiming, killing, &c., of horses or other cattle, is to be punished, at the discretion of the court, by transportation beyond the seas for life, for any term not less than seven years, or by imprisonment for any term not exceeding four years, and by public or private whippings, should the court so direct (7 & 8 Geo. 4. c. 29. § 25.; 7 & 8 Geo. 4. c. 30. § 16.) The facility with which horses may be stolen has led to the enactment of several regulations with regard to their sale, &c. The property of a horse cannot be conveyed away without the express consent of the owner. Hence, a *bonâ fide* purchaser gains no property in a horse that has been stolen, unless it be bought in a *fair*, or an *open* market. It is directed that the keeper of every fair or market shall appoint a certain open place for the sale of horses, and one or more persons to take toll there, and keep the place from ten in the forenoon till sunset. The owner's property in the horse stolen is not altered by sale in a legal fair, unless it be openly ridden, led, walked, or kept standing for *one hour at least, and has been registered*, for which the buyer is to pay 1*d.*

Sellers of horses in fairs or markets must be known to the toll-takers, or some other creditable person known to them, who declares his knowledge of them, and enters the same in a book kept by the toll-taker for the purpose. Without these formalities, the sale is void. The owner of a horse stolen may, notwithstanding its legal sale, redeem it on payment or tender of the price any time within six months of the time of theft." (*Burn's Justice of the Peace*, Chitty's edit., vol. iii. p. 264.)

"In order to obviate the facility afforded by means of slaughtering houses for the disposal of stolen horses, it was enacted in 1786 (26 Geo. 3. c. 71.), that all persons keeping places for slaughtering horses, geldings, sheep, hogs, or other cattle not killed for butchers' meat, shall obtain a licence from the quarter sessions, first producing, from the minister and two substantial householders, a certificate of their fitness to be intrusted with the management and carrying on of such business. Persons slaughtering horses or cattle without a licence are guilty of felony, and may be whipped and imprisoned, or transported. Persons licensed are bound to affix over the door or gate of the place where their business is carried on, in legible characters, the words '*Licensed for slaughtering horses, pursuant to an Act passed in the* 26*th year of his Majesty King George III.*' The parishioners entitled to meet in vestry are authorised to choose annually, or oftener, inspectors, whose duty it is to take an account and description, &c. of every living horse, &c., that may be brought to such slaughtering-houses to be killed, and of every dead horse that may be brought to be flayed. Persons bringing cattle are to be asked accounts of themselves, and if such be not deemed satisfactory, they may be carried before a justice. This act does not extend to curriers, fellmongers, tanners, or persons killing

aged or distempered cattle for the purpose of using or curing their hides in their respective businesses; but these, or any other persons, who shall knowingly or wilfully kill any sound or useful horse, &c., shall for every such offence forfeit not more than 20*l.*, and not less than 10*l.*" "Horse-dealers are assessed, if they carry on their business in the metropolis, 25*l.*; and if elsewhere, 12*l.* 10*s.* They are required to keep books, in which they must enter an account of the number of the horses kept by them for sale and for use, specifying the duties to which the same are respectively liable: these books are to be open at all reasonable times to the inspection of the officers; and true copies of the same are to be delivered quarterly to the assessor or assessors of the parish in which the party resides. Penalty for non-compliance 50*l.*"* This tax cannot but be regarded as exceedingly unequal and unjust. If it be good to raise money for purposes of revenue from dealers and traders, why not extend the practice, and impose taxes on other branches of trade.

Under the statute 1 & 2 William 4. c. 25., no toll can be demanded for any horse, ass, sheep, swine, or other beast or cattle going or returning from water or pasture, or from being shod or farried, provided they do not pass on the road more than two miles going and returning.

* M'Culloch's Commercial Dictionary, p. 655.

## CHAPTER VII.

### STABLE ECONOMY.

"Goodness moves in a larger sphere than justice; the obligations of law and equity reach only to mankind*, but kindness and beneficence should be extended to creatures of every species; and these still flow from the breast of a well-regulated man, as streams that issue from the living fountain."—PLUTARCH.

THE improvements in the stabling of horses, introduced since the establishment of the Royal Veterinary College by members of that institution, have been very marked. Many diseases engendered by an improper method of housing these animals have nearly disappeared. Glanders, Farcy, and Grease, the former scourges of the cavalry stables, are now comparatively rarely seen in them. But yet much remains to be done. In the majority of stables hygeinic measures are nearly disregarded, and the directing principles which should regulate their construction are too generally misunderstood or sadly neglected.

In selecting a site for a stable it is important that sufficient care be used to insure complete drainage, both of the water falling from the roof and the urinary secretions of the animals it is intended for. In either case it is absolutely necessary that the

* This fortunately is not strictly applicable to the present state of our jurisprudence; for the "obligations of law," upon one point at least — that of cruelty to our animals — is now "extended to creatures of every species."

fluids should be removed, in order to keep the stable dry; but this is not the sole reason why the urine should be speedily conveyed away, for it not only keeps the flooring in a damp state, but fills the stable with gases highly deleterious to the health of the inmates, frequently acting as the predisposing or exciting cause of dangerous and contagious diseases, as acute and chronic cough, pneumonia, farcy, glanders, and inflammation of the conjunctival membrane of the eyes.

It usually happens that the fluids of the stable are allowed to find their exit by an open paved gutter at the foot of the stall, or are suffered to be entirely absorbed by the litter, and removed with the dung when the stable is cleansed out. An under-ground drain, originating in a small grating fixed in the centre of each stall, and communicating with an external reservoir or cistern, is found the most ready and beneficial method of insuring the removal of the urine from the stable. This method saves the litter by keeping the floor of the bed constantly drained, it decreases the general dampness of the stable, and adds to the health and comfort of the inmates. In many of the cart-horse stables in London, a central iron grating is placed over a small cesspool, but no longitudinal subterranean conduit is constructed to convey the fluid away; consequently, when it is full, the grating has to be removed and the contents baled out. This is a very objectionable practice; for though the stalls and litter may be kept dry, yet these collecting cesspools are so many reservoirs of fermenting fluids, increasing the chemical decomposition, and poisoning the atmosphere of the stable with ammoniacal vapour. It is far preferable to have a continuous underground drain, from stall to stall, throughout the stable, terminating in a sunken external reservoir, so constructed as to preclude the

indraught of air up through the drains. Another advantage is attached to this manner of drainage; for as the fluid drains from the centre, there is no longer any necessity for that declivity of the flooring, which was requisite when the liquid passed away by the foot of the stall, for the ends and sides of the pavement of the stall may be of the same level, gradually bevelling towards the centre point where the grating is fixed.

The size of the stall must of course correspond in some measure to the description of horse it is intended for. It is well that it be of sufficient width to allow the horse to turn round without being liable to injure himself, but yet not too wide; for in that case the occupant will stand across it, a custom that may possibly be an indulgence to the horse, but which is almost always a source of annoyance to the attendant genius of the stable. The height of the ceiling or roof should be in all cases high, as it allows of the free ascent of the air heated and contaminated by respiration, and of its removal without submitting the inmates to a direct draught or current of air. The floor of the stalls should invariably be paved. The most usual material employed for this purpose is the Dutch clinker; but wooden blocks, and more latterly the patent elastic caoutchouc pavement, have been advocated, and in many instances adopted. The most common width of the stall is six feet. It is advisable, where a pair of horses only are kept, to have an extra stall, for the convenience of placing spare straw or other stable requisites in. When more horses are stabled together, it is extremely useful to remove the separation between two of the end stalls, and construct a box for use on emergencies. Indeed, horses are invariably found to prosper much better, when freed from the restraint which a stall imposes, that a loose box has become almost a *sine*

*quâ non* to every stable of the least pretension to economical arrangement. Boxing of horses is becoming, happily, more general every day in localities where space is not an imperative bar. In all cases of injury from over-exertion, and whenever disease attacks the animal, a loose box is a most desirable adjunct to the stable. Many diseases that would certainly prove troublesome, if not fatal, were the patient kept confined to the stall, readily give way to medical treatment when he is placed at liberty in the box.

In order that stables may be efficiently ventilated, it is necessary to establish a current of air through them; but care should be taken to prevent this simple change of air from being exalted into a draught. Ventilation is only necessary as a means of exchanging the air that has become unfit for respiration for the pure atmospheric gases. The temperature should be regulated by other measures. It is erroneous to suppose that because stables (such as those of the generality of farmers) are not air-tight, they are properly or sufficiently ventilated. They may be very pervious to the air, and yet but poorly ventilated. The emanations necessary to be carried off are, the air expired from the lungs, no longer proper for respiration from the quantity of carbon it contains, and the ammoniacal exhalations of the urinary and fæcal excretions. These, fortunately for our purpose, are lighter than the common air; the former from being rarefied by the internal heat of the animal, and the latter from the smallness of specific gravity. They, consequently, rise to the upper part of the stable, and should there be allowed to find an exit. But, to establish this, it is not alone sufficient that there is a passage outwards for the heated gases, but provision must be made for the re-admittance of fresh air near the floor. The openings for the entrance and exit of the air should be covered externally by a

grating, and so contrived as to be capable of graduation. Ventilation by the window can only be partial, and should not be resorted to. Light should also be freely admitted to all stables : it is almost as necessary to health as fresh air. Some have supposed that horses feed better in the dark ; but this is rather hypothetical. Continued darkness entices a horse to lie down more than is necessary, and is also destructive to the visual organs.

The supposed eastern origin of the horse has induced some to argue that a high temperature is his natural element ; still the time since his introduction here has been so great, that we might now safely suppose him to be perfectly naturalised. As cold has the effect of lengthening the horse's coat, warm stables produce the opposite effect, and render it shorter and more glossy. It is also noticed that he loses flesh in a cold stable, and consumes more food ; but this is nothing more than the invariable effect of alternations of temperature on all animals, and does not prove that heat is imperatively requisite. Nevertheless, if benefit is derivable from warmth, care should be taken that that warmth should not be generated either by the crowding of horses together, or from the fermentation of the dung and litter. The required warmth should be the result of good housing, generous food, sufficient clothing, and attentive grooming, rather than artificial heat of any description. To prevent evil from sudden transitions, the clothing, &c. should be adapted to the season, and the thermometer may be kept in the winter time at about 55°, and in the summer, not much above 60° Fahrenheit.

A great improvement in the economy of the stable is the daily removal of the litter. It is not alone on account of the saving effected that it is to be advocated, for, possibly, the extra labour and inconvenience balance the saving of straw effected, but other

more weighty reasons suggest its adoption, by attesting its general conduciveness to health. If retained, it prevents the quick and perfect drainage of the stall; it heats the feet and legs, causing a rapid wiring-in of the heels, contraction, thrushes, cracked heels, and swelled legs. A bed in the daytime entices the animal to lie down too much, and often provokes foul feeding. Some of our cavalry stables are a disgrace as well as a loss to the country. At the dictate of the commanding officer, who possibly likes to see the horses *comfortable*, they are kept constantly bedded up to their knees: the result is, that there is scarcely a horse fit for actual service in the regiment. If attempts were made purposely to produce disease of the extremities, none could be found more destructively efficient than this baneful practice. Many of the evils which are falsely attributed to concussion, hard roads, bad shoeing, &c., are the evident results of this unnatural manner of keeping the feet. Veterinarians who wish to act honourably by their employers, should be loud in their remonstrances against the continuation of this destructive stable custom. It is their duty to point out its injurious tendency. The most ancient writer on cavalry affairs extant, Xenophon, is specific on this point. He says, "It is good to enjoin the groom to carry out to one place, every day, the dung and straw from under the horse. When he does this, he will remove it with the greatest ease, and, at the same time, do a benefit to the horse." The Arab litters his khayle with a shallow bed of dried horse-dung, which is daily removed and exposed to the sun: a similar practice obtains throughout Persia. In Egypt the floor of the stable is covered with fine desert sand, which is repeatedly changed, and never allowed to be saturated with moisture; and in no country in the world are the feet and legs of horses more free from disease.

The situation of the hay-rack is generally too high; and, from its usual sloping position, the hay-seeds are very apt to fall into the eyes, and irritate them. In addition, an elevated hay-rack constrains the horse to take his food in an unnatural posture, and is consequently open to objection on that ground.

*Horse Provender, Feeding, &c.* — The principles which should guide us in providing and apportioning food for the horse, should accord with his economy and habits. His anatomical construction would lead to the supposition that he was not so well adapted for alternate repletion and abstinence as some of the carnivora and ruminantia. His stomach is small; he possesses no reservoir for bile. Digestion is with him almost a continuous process, and to derive sufficient nourishment from the grasses of the field, he is compelled to continue eating for the major part of his time. The chief inference to be drawn from these facts is, that he should be fed at intervals not too widely separated; that the manner of feeding should approximate to nature, and be in consonance with the physiological functions of his digestive organs. In Germany, and other parts of the north of Europe, it is the laudable custom to feed horses, when on the road, at very short intervals of time, with rye-bread. The quantity of labour they are, through this practice, enabled to perform, is, comparatively, remarkable, and that without exhibiting any of the customary symptoms of distress. Overloading the stomach is a direct and fruitful cause of acute indigestion, and staggers. Should there be a large quantity of undigested food in the stomach, and water allowed upon it, the animal, from some untraced connection between the stomach and feet, will be very liable to suffer an attack of founder.

Many an illustration of the ill effects resulting from continued abstinence from food is revealed to the veterinarian. In demonstration of this, the fol-

lowing cases may be instanced. Some barge horses, belonging to a person at Kingston-on-Thames, were repeatedly attacked with acute indigestion, exhibiting symptoms very analogous to gripes, but still not giving way to the usual remedies employed in that disease. This occurred again and again; and, on the last occasion, no less than six horses were attacked simultaneously. I was then led to make the fullest investigation of their previous management; when it came out, that they had been at work from early dawn to late at night, without food, until they had completed their labour. They were then fed with oats and chaff to repletion. One of them died, with all the recognised symptoms of high inflammation of the alimentary canal. On a *post-mortem* examination being made, which was done immediately, the stomach and bowels were found full of undigested food, dry and very closely impacted, originating extensive inflammatory action throughout the stomach and intestines. No time was to be lost; this, together with the previous information, had revealed the cause of the affection; and measures were promptly taken, which in all probability saved the others attacked. The warning given to the owner had its effect; for, by properly feeding his cattle afterwards, no recurrence of the malady took place. Numerous instances of similar affections, from the same cause, have frequently come under my notice, in all of which the complaint had been mistaken for gripes, though no true spasmodic action was present, and the pain and irritation arose solely from the presence of a large quantity of unmasticated and indigestible food in the *primæ viæ*. The nose-bag feeding system, adopted so generally in London by the owners of cart-horses, cannot become too common wherever horses labour long together without returning to the stable. If this useful practice were more extensively employed

in the agricultural districts, among the farm-horses, the pseudo gripes would certainly be less prevalent, and many an useful horse would be saved from an untimely end.

The kinds of food appropriated to the sustinence of the life and powers of the horse, in different countries, is very various. Oats and hay constitute the chief horse provender of England; barley and straw-chaff is given throughout Spain, Portugal, Italy Turkey, Morocco, Algiers, Egypt, Arabia, and Persia; rye is used as a horse-corn in North America, and rye with rye-straw chaff and rye-bread is employed in Germany and other parts of northern Europe. A vetch is largely consumed in Bengal; and in Bombay and about the Persian Gulf, a sort of pea, termed gram, is much used. In some parts of Persia unhusked rice is given as a dry food. Dates are extensively used among many Arab tribes. Furze, or whin, is bruised and frequently used as provender for horses in Scotland and in the Pyrenees. Apples, vine-tops, and lime leaves are occasionally employed for the like purpose in the south of Europe. In some parts of France, and about Naples, couch-roots are publicly sold as food for horses and mules. Various other substances are elsewhere applied to this purpose. Sea-weed is eaten by the ponies of the isles north of Scotland. Milk*, and even flesh†, either raw or

* "Two of the horses were very handsome, though small; and on remarking their extreme fatness, I was surprised at learning that they were fed entirely on camel's milk, corn being too scarce and valuable for the Tibboos to spare them: they drink it both sweet and sour; and animals in higher health and condition I scarcely ever saw."—Narrative of Travels and Discoveries in Northern and Central Africa; by Major Denham, and others; 3rd edit. vol i. p. 170.

† Horses have been frequently known to exhibit an inclination for animal food. A remarkable instance is recorded in the fifth volume of "The Veterinarian." Butler alludes as follows to the same propensity:—

"Although his horse had been of those
That fed on man's flesh, as fame goes;
Strange food for horse! and yet, alas!
It may be true,—for flesh is grass." *Hudibras.*

boiled to rags, have been resorted to, as aliments for the horse. On the southern coasts of Arabia, dried fish has been used from time immemorial; and Herodotus mentions that the people living in the vicinity of lake Prasias were also accustomed to feed their horses and cattle on fish. The Icelanders, the Faroese, and the Shetlanders do the same thing, and they also apply dried whales' flesh, which is generally served up as a soup, with a small quantity of fodder, to the like use. "In the northern parts of the state of Michigan," says Captain Marryat, in his "Diary in America," "hay is very scarce, and in winter the inhabitants are obliged to feed their cattle on fish. You will see the horses and cows dispute for the offal; and our landlord told me that he has often witnessed a particular horse lie in wait very quietly while they were landing the fish from the canoes, watch his opportunity, dart in, steal one, and run away with it in his mouth."

*The Grasses.*—The natural means of subsistence are the grasses of the field, but in this country, few horses are entirely restricted to a grass diet. Green food of itself is insufficient to support the animal when at hard work; it is too bulky and innutritious. On this food alone, the muscles never acquire the necessary tonicity: the horse is soft, sweating profusely on the least exercise, and easily exhausted. When labour is demanded, it is necessary to condense the aliment given, in proportion to the severity of the work. From their succulence, the natural grasses should always form the chief food of brood mares and foals. They contribute to an abundant secretion of milk, and are best fitted as early food to the stomach of the colt. In the adult and hard-working horse, an occasional recurrence to green food is generally supposed to purify the blood. Its laxative and alterant effect cannot be questioned. Green meat, when

first allowed, acts very perceptibly on the kidneys, and occasionally produces an eruption on the skin, which often continues for a long time, in spite of all remedies.

When the horse is kept on the grasses, whether natural or artificial, inflammatory disease commonly assumes a less virulent character, but he is less capable of resisting the attack of epidemic or epizootic affections. If the cultivated grasses, such as tares, clover, lucern, rye-grass, &c., be cut, and given in the stable, it is termed "soiling." This is a very general practice, as a means of in-door summering; and is also used as a partial summer-nutriment to those horses whose occupations are not of the severest description. If continued, or extraordinary exertion be required, grass should not for some time previous form any part of the animal's nutriment. Lucern, a favourite horse-food of the Romans, is now again very extensively grown. The ease and economy of its cultivation, the almost continuous supply which it affords, and the evident relish with which it is partaken of, would all seem to suggest its more general culture. Green corn, with the exception of rye mingled with vetches, is seldom applied in this country as horse-food; but it is used extensively in some parts of the Continent. In America, green Indian-corn is highly spoken of; and in other parts of the world the sugar-cane is planted expressly for the purpose of being cut while in a green state as food for horses and cattle; a practice which might possibly be employed with advantage in the southern parts of England. Raw sugar is found to be a nutritive food for the horse: and it is customary in the department of the Moselle, among the beet-root sugar factors, to damp their chaff (chopped-straw) with molasse-water, upon which, it is said, without oats, they do good service.

*Dry Fodder — Hay, Straw, Chaff, &c.*—An expe-

rienced horse-master will always be most particular in the selection of his hay. He will reject such as is of a musty, heated, or mow-burnt description; not only that is innutritious, but because it is positively injurious to the animal. Musted or heated hay has a pernicious effect on the lungs, and often lays the foundation of broken wind: its continued use injures the digestive functions, tends to produce indigestion, foul feeding, and cribbiting. Mow-burnt hay frequently causes acute inflammation of the kidneys; a disease always endangering the animal's life, and calling for the most prompt veterinary attendance. New hay is likewise considered debilitating. Hay ought always to be kept nearly twelve months before consumption. It should smell pleasantly and be sweet-tasted. Hay, to be properly made, should be ricked while yet there is a certain portion of the juices of the grass retained. If stacked while too succulent, it becomes mow-burnt; if wet with rain or dew, it musts; and if left until it is too much dried, it cuts out poor and harsh. When a slight portion of the juices is retained, the saccharine fermentation is set up, greatly increasing the sugar contained in the hay, and consequently its nutritive properties; but if from the presence of too much moisture, the fermentation proceed beyond this point, the sugar will be transformed into vinegar, by the accession of the acetous fermentation. Hence the sweet taste of hay properly made, and the sour reaction of that which has been mow-burnt. Salting hay in the rick is a most destructive practice. Nothing could be more ill-judged. Because animals are fond of salt, it was argued, that if hay were salted, they would always clear their rack of it, to the last morsel. Such is not the case; for much more is wasted than there would be if the pernicious custom were given up. Salt sprinkled on new-made hay in the stack, soon attracts mois-

ture from the atmosphere, deliquesces, and musts the whole, however good it might previously have been. In this manner I have seen many hundred tons of good hay greatly deteriorated. It is preferable to adopt any other method of administering salt, than that of brining the hay in the stack.

Clover hay is esteemed rather more nutritive, weight for weight, than meadow hay. The daily allowance of hay will depend on the size of the horse, and the quantity of corn given. In fast work, large quantities of hay are improper. A truss a-week is a medium allowance. A dray-horse will consume more than twice that quantity. It has been calculated that eight pounds of meadow hay, or seven of that made from clover, tares, or sanifoin, are proportionally as nourishing as three pounds of oats.

Almost every kind of straw is used to fodder horses; but there is a prejudice in some parts of England against oat straw. In France, Spain, Germany, and many other nations, straw, cut short, is used, to the partial or entire exclusion of hay. Straw is not applied to any great extent as horse food in this country. In Egypt, the machine which thrashes the barley at the same time cuts the straw into short pieces (tibbin). This is packed in large coarse nets and employed very extensively as food for horses and camels. Bean and pea haulm are often given to farm horses. The French, says Arthur Young, prefer the former for horse-food, but the latter is more generally esteemed here. In the straw-yard, horses support a very decent appearance, throughout the winter, on barley straw alone. It is not advisable, however, to restrict horses to a straw diet. They are much more easily got into working condition when allowed a feed or two of corn daily in addition. Mr. Stewart remarks, with his usual expressive brevity, that "good straw is certainly better than bad hay; and possibly, by increasing the allowance of corn,

and cutting the straw, hay might be almost entirely dispensed with. Though containing much less nutriment, it still contains some; and it serves quite as well as hay to divide the corn, and give it a wholesome size. It must be understood that food ought to possess bulk proportioned in some degree to the capacity of the digestive organs. Nutriment can be given in a very concentrated state; yet it is not proper to condense it beyond a certain point. Corn alone will give all the nourishment which any horse can need; but he must also have some fodder, to give bulk to the corn, though it need not of necessity yield much nutriment. Straw, therefore, may be used where hay is used."* With many practical men, rack-feeding is altogether discarded. It is considered much more economical to convert the hay and straw into chaff, and give it with the corn, in the manger; thus preventing much waste, and ensuring due mastication of the corn.

*Corn.* — Nearly all the cerealia have been applied on different occasions to support the horse. Wheat is devoured with great relish by him; but, from its expensiveness, it is not likely ever to come into general use as a horse food. When given without preparation, it is apt to produce colic, and even death, by over-distention of the stomach, from a fermentation which it sets up. Maize, or Indian-corn, is attended with the same ill effects; but still maize forms a good and nutritious horse-diet, and is used extensively in the United States and in Canada. The evil attending such cases, in all probability, arises from the suddenness of the change of diet, and not from any pernicious principle inherent in the corn, and might be produced by other of the ceralia. For example, when in 1813, the French army entered Spain, the horses were suddenly put on a regimen of barley

* Stable Economy, p. 189.

and chopped straw; numbers of them were carried off, from this cause, at the commencement of the campaign. If they had been gradually accustomed to it, no ill effects would have resulted; for barley is a wholesome horse-corn; more extensively used, as such, than any other, though rarely given in this country. From the dampness of the climate of the British isles favouring its growth, the preference is here given to the oat, which constitutes almost the sole horse-corn. Oats, when new, are apt to have a laxative effect on the horse. It is proper that they should have age before use, be plump, heavy, sweet, and clean. The oats brought to London from Ireland, though in themselves good, are frequently mixed with small stones, from the habit which there prevails of winnowing the corn on the bare ground. Black oats are supposed to possess an extra portion of nutritious matter; but those which have generally fallen under my notice have certainly not been celebrated for their good qualities. The thin-skinned potato-oat is certainly highly nutritive, but when given without chaff, it passes too rapidly through the digestive canal; and horses do not prosper so well on these as on a coarser description of oat. Many greedy feeders swallow much of their corn without proper mastication; the oat thus escapes digestion, and is ejected in a whole state, occasioning considerable loss. To prevent this, chaff should be mixed with the feed; or better still, for old horses, the oat should be previously bruised in a hand-mill. This practice, from its evident economy, is becoming very general; it ensures the digestion of every grain of corn. Beans, mixed with oats, are in very common use: they are seldom given alone, being regarded as too stimulating. They condense a great deal of nutritious matter; and whenever extraordinary exertion is required of the animal, they always profitably form a component part of his food.

To washy horses they are indispensable. New beans, like new hay and oats, have a deleterious effect. Large quantities of malt are consumed in Holland and Germany for feeding horses; but malt cannot be so applied in this country, on account of the heavy duty imposed by government on the article. The practice of steeping and partially malting corn for cattle-food, is however allowed by the excise; and some of the farmers of Norfolk and Suffolk avail themselves of this licence.

From the subjoined table, some idea may be formed of the relative quantity of nutritive matter contained in the chief articles used for the artificial support of the horse.

*Table of the Proximate Principles of Horse Food.*

| One hundred parts of | Water. | Husk or Woody Fibre, | Starch, Gum, and Sugar. | Gluten, Albumen, and Caseine. | Fatty Matter. | Saline Matter. |
|---|---|---|---|---|---|---|
| Field Beans - | 16·0 | 10·0 | 40·0 | 28·0 | 2·0 | 3·0 |
| Barley - - | 15·0 | 15·0 | 60·0 | 12·0 | 2·5 | 2·0 |
| Oats - - | 16·0 | 20·0 | 50·0 | 14·5 | 5·6 | 3·5 |
| Meadow hay - | 14·0 | 30·0 | 40·0 | 7·1 | 2 to 5 | 5 to 10 |
| Clover hay - | 14·0 | 25·0 | 40·0 | 9·3 | 3·0 | 9·0 |
| Wheat straw - | 12·0 | 50·0 | 30·0 | 1·3 | 0·5 | 5·0 |

*Bread.* — Horse-bread was anciently extensively used in this country, but from some reason it has long fallen into disuse. It still continues to be employed in Holland, Germany, and the north of Europe. The researches of the chemist leave little doubt that the panary fermentation which meal undergoes before it becomes bread, tends materially to increase its nutritive properties. This is well established: but whether the gain, by the increase of the assimilative matter, is sufficient to cover the additional expenses of labour and fuel necessary to convert raw corn into bread, is somewhat questionable.*

* The details of some experiments in horse-bread-making on the Continent, translated from the *Recueil de Médecine Vétérinaire Pratique*, of

*Carrots* are the most esteemed of all the edible roots for feeding horses. Their use is becoming very general. Some persons boil them first; but that is

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1837, may furnish some examples of the progress made there in this branch of stable economy.

"In Sweden, a bread for horse-food has been long fabricated. It is usually composed of equal parts of rye flour and oatmeal, to which is added a little salt and, a few drops of *eau-de-vie*. This bread, baked a little in excess, is broken and mixed with chaff (chopped straw), and given to the horses. The saving is 33 fr. 75 c. per horse per year." (*Mém. de l'Académie de Stockholm*, 1772.) Nothing, however, is said of the health and vigour of the horses fed with this bread.

The *Journal des Haras* (tom. ii. p. 184.) reports, that in Silesia they supply themselves with bread made with equal moieties of rye and oat flour.

In 1826, M. Darblay suggested to the *Société d'Agriculture de Paris*, a bread composed of equal parts of wheat, beans, and barley. His experience was founded on practical experiments during two months. He fed two horses of the Berny post with four and a half kilogrammes (nearly 10 lbs. English) of this bread per day. These horses preserved their usual strength. The economy was 44 centimes per day for each horse.

The bread given in 1829, at the Alfort school, was composed of an equal quantity of bean flour, rye, and wheat (fourth quality). It rendered the horses more frothy and liable to sweat.

In 1833, some establishments of Paris essayed to substitute for a part of the oats usually given to their horses a bread compounded by M. Fenlard. To a great proportion of oatmeal was added a less quantity of barley, bean, and wheat flour, with a little salt.

In 1832, M. Guénier, post-master of Saint Bris, department of Yonne, commenced by substituting, for three fourths of the ration of oats, an equal quantity (in weight) of bruised rye. This regimen was continued for a month. The first results were unfortunate, for out of sixty horses who were submitted to this regimen, M. Guénier observed, between October and May, no less than two attacks of indigestion per week, some of which were very severe. During the course of the summer, he had thirty cases of founder; but the indigestions were reduced to two per month, which was attributed to the habitude the horses had acquired for the food. In 1835, M. Guénier adopted the following method of feeding: Best rye, 175 litres; best barley, 25 litres. These 200 litres of grain were put into a copper cauldron, capable of holding 400 litres, with 150 litres of water—a sufficient quantity to make a bath for the grains. Heat was then applied until they burst, when they were removed from the cauldron, bursting being a sign of their being sufficiently cooked. This mixture was then baked and cooled in the square, on the understanding that it represented a volume of 500 litres, to be given in the 24 hours, at the rate of 75 litres for each set of five post-horses, with 10 litres of oats, at least, per set; or at the rate of 100 litres per set of five horses of fast work, omitting the oats. This food maintained the horses in good condition.

unnecessary, as the horse always partakes of them with the greatest relish when raw. As they are grown in light sandy soils, they are generally pretty clean, and do not require washing. If they be washed long previous to use, they are apt to heat and rot. It is best to give them in their whole state, as it is far the least dangerous method. When the horse has been long deprived of his natural food, carrots appear to have a beneficial effect on his constitution. If given too freely at first, they invariably relax the bowels. Their general action is that of a gentle alterative, affecting the kidneys, lungs, and skin. Mr. Durham, of Turnham Green, in a letter to the "Times," urges the economy of carrot feeding. "At this season of the year" (November), says he, "I lay in a sufficient store of either white or red carrots (white preferred) to last to the spring, and for every stud of eight horses I deduct from their daily allowance of oats, (which is four bushels, or 152 pounds,) one bushel, or thirty-eight pounds; in place of which I substitute about seventy-two pounds of carrots (sliced thin, and then mixed with the chaff and oats,) in every stud per day. Now, taking the number of horses working in the omnibuses round London at eight per omnibus, and the number of omnibuses at 1400, the saving in the consumption of oats by omnibus horses only, would be 1400 bushels, or 175 quarters, per day."

*The Swede Turnip* is sometimes sliced and mixed with the corn of agricultural horses. They have a fattening effect; but, as they distend the digestive organs, they are consequently inappropriate for fast-working horses.

*Potatoes*, either raw or steamed, are likewise used for feeding farm horses. Cooking increases their nutritive properties. In the raw state they are too watery, and have a relaxing effect on the bowels. Fifteen pounds of raw potatoes is said to be equiva-

lent in nutriment to four and a half pounds of oats. Fifty pounds per day of steamed potatoes is the usual allowance of a farm horse as winter food. On this diet alone he maintains a good working condition, and is equal to all the ordinary duties of the farm. Attempts have been made in France to supersede the oat by the employment of baked potatoes as horse food. No inconvenience arose from a complete diet of baked potatoes; and the horses to which they were given did good service during the whole of the season. In the Hainault, M. P. Goblet Delahaye adopted a similar plan with satisfaction, as a winter food. He slightly varied the above process, by substituting a cake made of baked potatoes and straw chaff. (*Journal des Haras*, iii. p. 97.)

*Quantity of Food.*—It must be always remembered, that though slow work does not materially impede digestion, fast work has a direct tendency to suspend the process. Thus, it is not only improper, and hurtful to the wind, by mechanically pressing on the lungs, to load the stomach immediately before undertaking rapid exertion, but destructive to the tone of the digestive organs themselves. The quantity and description of the food should vary with the size and character of the horse, and the nature of the work on which he is employed. With racers and hunters, and other horses used for fast work, the object kept constantly in view, is to condense as much as possible the nutriment offered in the food. In this way the animal is not only able to undergo more stringent exertion, from the proper supply of azotised aliment giving vigour and hardness to his muscles; but the space occupied in the abdomen by the food is so small, that it allows the freest action of the organs of respiration. Thus, to horses of this grade but little hay or other fodder is necessary. Sometimes none whatever is given. With hunters, the usual working diet is five feeds or quar-

terns of sound oats, with half a pint of beans in each feed, daily. When fed in this way, a truss of hay a week is quite sufficient. If hay be given in larger quantities, it is found detrimental to the wind, by increasing the size and weight of the carcase. Where less speed and sudden energy are required, the supply of oats is diminished, and beans are allowed only during the winter. In these cases the hay is rarely limited. Farm horses generally receive about two bushels of oats per week, with chaff and hay during the winter months, and one bushel of oats, with green meat, in the summer. Others only allow for the year's consumption of a farm horse, ten quarters of oats, with an acre of clover, rye-grass, or tares for soiling in the summer; hay to the amount of one and a quarter ton, given in October; and in November, March, April, and May, straw chaff, with the produce of a quarter of an acre of potatoes or Swedish turnips, when neither grass nor hay is given. To the heavier draught horses it is necessary to allow an increased supply of corn in proportion to their size and the severity of their work.

*Watering.*—In Arabia and Egypt, horses are commonly watered but once a day. In Persia, the custom is to give them water at sunrise and sunset. In England, they are usually suffered to drink thrice during the day. In hot weather, the quantity given at a time is decreased, but it is given more frequently. Broken-winded and washy horses are generally restricted in their water during the day; but they should be allowed as much as they choose in the evening. Hard, or even strange water, disagrees with many horses; and for this reason careful trainers frequently carry sufficient of the water their horses have been accustomed to partake of, to supply them until the decision of any important race in which they may be engaged. Soft water is invariably preferred by the horse, if he be allowed to select for himself.

When horses are watered in the stable with pump water, it should be pumped some time previous to use, and placed in the stable, or allowed to stand in the sun, according to the season, in order that it may acquire a temperature near that of the atmosphere. It is always injudicious to give a large quantity of water either before work or to a horse heated by labour. Racers and hunters are stinted of water for a day or two before running; and on the day of action, none at all is given.

*Exercise, Condition, Training.* — Mr. Blaine, with his accustomed point and sagacity, remarks, that "in a state of nature, the benefits of exercise are constantly in action, as well from the inherent love of play, as the search after food. This propensity is wisely given, and strongest in those in whom it is most necessary: in the young, to enforce circulation, that the vessels may be stimulated to their deposit for the growth of parts; and in the lusty and plethoric, that the absorbents may be kept in equal action with the secreting vessels: we therefore see such several times in the day race round a field with all the frolicksome sport of children. In the debile and the old, in whom the absorption is equal, and often greater than the deposit, this would be unnecessary, and they are not equally stimulated by a love of play. The horse is, therefore, an animal intended by nature for exertion; and whenever we deprive him of *exercise*, we prevent the proper balance being kept up between different parts of the frame." *

Exercise is imperatively necessary to a tonic state of the motive system. Without it, a horse is unconditioned, soft in muscle, frothy, and soon exhausted. No greater error can be committed than

* Vet. Outlines, p. 522.

to suppose that continued cessation from labour increases the power of undertaking it. On the contrary, a capability of executing the most arduous tasks of speed, strength, or continuous exertion, is almost solely attributable to preceding rigorous preparatory exercise. Condition results from a sufficient supply of azotised diet, and preliminary exercise proportioned to the labour required: such are the only elements needful to its perfection. It was formerly a dictum among trainers of cocks for the now obsolete amusement of cock-fighting, — "that *the best undieted cock* was unable to encounter the *worst* that had been *dieted;*" so also, it cannot but be frequently remarked, that a horse structurally imperfect, when well-conditioned, is enabled to outstrip those of better mechanical formation, if unprepared for work, either on the turf, the road, or in the field. "*Air and exercise,*" says Mr. Karkeek, of Truro, "with a proper supply of nitrogenised food, such as oats, peas, beans, &c., contain the grand secret in the art of training. But these articles also contain a large portion of starch and fatty matters, and yet, when in proper condition, the hunter never becomes fat; and the reason is, that these substances, by the constant exercise which is given, are consumed in the lungs, whilst, under different circumstances, the same horse, with little exercise and little oats, being fed chiefly with straw, hay, and turnips — articles that do not contain a quarter part of the fattening principle of food contained in the hunter's diet — would be found plump and fat. Here we have the normal and abnormal conditions compared together, as they regard the capability of horses to undergo fatigue, since the well-conditioned hunter is capable of undergoing great exertion with little fatigue, whilst the frothy lather with which the non-conditioned horse is covered after

very little exertion, evinces undeniable inferiority." * Hence the benefit of the practice brought into repute by the writings of the late Mr. Apperley (Nimrod), of allowing the hunter corn during the summer months. Instead of being turned to grass, he is soiled in a box, or small paddock, or green-yard, and fed moderately with corn. The expense of keep is increased, but the horse is easier got into hunting condition, and stands his work much better. Collateral aid would evidently result from a course of sub-training exercise, so as never to allow the muscular system to become loaded and soft from inactivity. Through the first part of the summer the exercise should be moderate, but increased towards the approach of the hunting season, so that the animal, by an easy transition, might be duly prepared for the active operations of the field. These suggestions are strengthened by the observations of an old anonymous writer on horses, from whom Nimrod might possibly have obtained the hint of his summering system. He says, "It has been remarked in a celebrated hunt, that the hacks which had been severely worked all summer, have, before Christmas, been in higher condition, and beat the best hunters, who have been at grass till September;—from hence, as well as for other reasons, I conclude, that the hunter, instead of having been benefited, had been injured by his trip to grass, and does not recover it in less than three months; consequently had better have been gently worked all the summer, on green food with his corn, given in the stable, or if possible out, in an open cool hovel or stable." † In this extract may be discovered all the elements of the prac-

* Journal of the Royal Agricultural Society of England, vol. v. part 1. p. 254.

† Considerations on the Breed and Management of Horses. London, 1778.

tice so ably recommended by Nimrod, conjoined with the praiseworthy plan of not allowing the horse's muscles to lapse into a state of ill-condition from total desuetude.

On taking a horse from grass, straw-yard, or other such food occupying considerable space in his abdomen, one of the first steps necessary to expedite his conditioning, and more readily adapt him for his work, is to administer one or more doses of cathartic medicine. This assists the reduction of the belly, and, at the same time, improves the state of the secretions. It lightens the carcass at once, and allows, by the loss of weight, of exercise being taken without danger or detriment to the legs or lungs. Corn and dry food should be given in moderation when a horse is first removed from a complete grass diet, as it is liable to produce constipation and other ill effects if forced too quickly on him. It is not requisite that so much caution be exercised when he comes from a straw-yard, but in either case, a nightly bran mash, or a feed or two of carrots during the day, will enable us to steer clear of the dangers of sudden repletion. Sprinkling the hay with water is also of some service in such cases. The quantity of water should be unlimited, for there is a greater demand for it to aid the digestive powers, and the horse is often slightly irritated and heated from confinement in an atmosphere frequently of a temperature many degrees higher than that he has been previously accustomed to. A slight fevering or irritation generally results on removing horses from the country to stables in London, and young horses sometimes suffer severely from this cause.

The practice of sweating horses inside the stable, by loading them with clothing, tends to clear them of fat and lighten the carcass; but this custom should always be used with care, judgment, and modera-

tion. Its immediate and general effect is debilitating, nearly as much so as the abstraction of blood would be. A sweat taken in the open air, without clothing, not only contributes to the removal of fat, but gives energy to the respiratory, circulatory, and muscular systems. A great deal is said by trainers of the necessity of reducing the flesh. This expression is altogether erroneous, and inapplicable to what takes place in conditioning horses for work, founded as it is on false ideas of what is and what is not *flesh*. Of true flesh or muscle, a horse can never have too much, as it is the peculiar organ of motion; and the greater the bulk of muscle, the more powerful and effective will be its contraction. That which is removed by sweating and exercise is fat and cellular tissue interposed between the muscular fibres; but exercise actually augments the bulk of the muscles themselves, and increases their tonicity and firmness.* Muscles

* *Persian and Toorkmun Training.* — Persian horses are sometimes brought to perform almost incredible journeys by undergoing excessive training. "When any expedition of great length, and requiring the exertion of much speed, is in contemplation, they commence by running their horses every day for many miles together; they feed them sparingly on barley alone, and pile numuds upon them at night to sweat them, until every particle of fat has been removed, and the flesh becomes hard and tenacious, of which they judge by the feel of the muscles, particularly on the crest, at the back of the neck, and on the haunches; and when these are sufficiently firm and hard, they say, in praise of the animal, that his 'flesh is marble.'"—*Fraser's Khorasan*, p. 270.

"Before a Toorkmun undertakes a foray, or chupao, he trains, or, to use his own expression, 'cools his horse' with as much patience and care as the most experienced jockey of the turf, and the animal is sweated down with a nicety which perhaps is unknown to these characters. After long abstinence from food, the horse is smartly exercised, and then led to water. If he drinks freely, it is taken as a sign that his fat has not been sufficiently brought down, and he is starved and galloped about till he gives this required and indispensable proof. A Toorkmun waters his horse when heated, and then scampers about with speed, to mix the water and raise the temperature of the animal's body! Under this treatment, the flesh of their horses becomes firm, and their bottom incredible. I have had authentic accounts of their performing a journey of 600 miles in seven or even in six days. Speed is at all times looked upon as inferior to bottom."—*Lieut. A. Burnes' Travels into Bokhara*, vol. ii. p. 273. London, 1834.

lose size and power by disuse, and are strengthened by being exercised; but the exercise must be carried something beyond the ordinary and habitual exertion, in order to stimulate them to their full magnitude and force. This law applies equally to the involuntary as to the voluntary muscles. Thus the power of the heart, diaphragm, and such other muscles beyond the influence of the will, or only partially under its control, are as readily augmented in strength by the exertion that calls their functions into perfect action as those of voli-motion. Exercise should naturally be proportioned to the age and strength of the horse, and the object desired to be obtained. Horses that are of a full habit of body should go but a slow pace and a short distance at the first trials. As the carcass becomes finer and the legs improve in stability, the pace and distance may be increased. Darvill states, that the proper length of the sweating course of a yearling race colt is two miles; for a two-year-old, two miles and a half; for a three-year-old, three miles, or three miles and a half; and for a four-year-old, four miles. In preparing for a four-mile race, the colt may have to sweat four and a half or five miles. When a horse is properly conditioned for racing, the muscles are freed from all extraneous matter, as interstitial substance and fat; the superficial ones should appear clearly and distinctly separate from each other beneath the skin; under the hand they should feel firm and rigid; and in action should exhibit the utmost mobility and vigour. The size of the abdomen must be reduced so as to be no longer a load to the legs or an impediment to the fullest action of the lungs. The food given should condense as much nutriment in as small a compass as possible. With little modification, the same severe system of training is to be adopted for the steeple-racer and the fox-hunter.

Where more substantial service is required, the training becomes nothing more than conditioning, — the same thing in substance, though less in degree; differing only in the extent to which it is carried. Horses employed for continuous and slower exertion, may be allowed to retain a larger carcass, and food of a more bulky character may be partaken of. Descending again to such as are applied to the slowest description of labour, the food may be selected with less care as to its capacity, a heavier carcass allowed, and fat may be tolerated on some parts of the frame with advantage to the performances of the animal. But in all cases, from the racer to the dray-horse, the full product and effect of the muscles of voli-motion can only be insured by their constant use, exercise, and action.

*Grooming.* — There is no great art, but very considerable labour, in dressing or grooming a horse properly. It is more frequently negligently performed than done efficiently. The manner in which a horse is groomed soon tells upon his health, spirits, and appearance. A good dressing tends to equalise the circulation, to generate animal electricity, to improve the excretory action of the skin, and through these re-act with beneficial effect on the whole system. Friction applied to the surface of the body may be regarded as exercise, and, like it, is highly salutary. It bestows health and energy, and health is generally accompanied with beauty. The less horses are cleansed inside the stable the better for them and their companions. If the weather permit, it is generally best done out of doors. Race-horses are almost invariably cleansed in the stall, as they are found to submit to it more quietly than in a freer state. On removing the clothing (if clothing be worn), the instrument first applied is the currycomb. To some thin-skinned horses the sharp teeth of this implement

is almost intolerable. It should always be used lightly and carefully. It is considered necessary to remove dirt and dandriff; but it is questionable whether it might not be dispensed with by the substitution of some less objectionable instrument. A currycomb cannot be used without danger of abrading the skin on the head, hocks, and other surfaces where the bones are but superficially covered. The ancient Greeks, for this reason, interdicted the use of any iron or wooden instrument in cleansing the horse's head, and directed that it should be washed daily;—a practice possibly attended with no ill effect in their warm climate, but inapplicable in our more temperate and changeable parallel. For thin-coated horses the currycomb should be discarded, and the whalebone dandy-brush substituted in its stead. This, with a horsehair rubber, is almost all that is necessary. Horsehair gloves are much used for grooming in the cavalry stables in India, and they might be generally adopted here with much advantage, being eminently serviceable in drying the legs and restoring the circulation in them in wet and cold weather or during sickness. After the removal of the dirt and dust, in the absence of a horsehair rubber, the groom uses a wisp of hay to gloss the hair with, and then, sometimes, as a finishing touch, a light linen duster is passed over the body. The long hair of the mane and tail is then combed with an appropriate instrument, and the eyelids, muzzle, and anus cleansed with a moistened sponge. When a horse comes in much splashed with mud and dirt, a very useful implement to remove the chief part of it at once is, what is termed by stablemen the "under-ostler." This is nothing more than a short-handled broom made of fine heath. At other times the iron scraper is beneficially substituted to remove moisture, dirt, or perspiration;—thus hastening the drying of the skin—

a point always of importance. The sooner a horse is perfectly dried the better; for nothing tends to lower the vital energy of the animal more than allowing him to stand for hours steaming with moisture, and drying solely by slow evaporation. This point offers a distinctive test between good and bad grooming. The great cold produced by the vaporisation of the aqueous matter reduces the constitutional powers to such an extent, that if he be fortunate enough to escape disease, he will invariably require an extra supply of food to keep him in condition. The benefit derivable from the modern practice of clipping is attributable solely to the fact of its diminishing cuticular evaporation. When a horse comes sweating from his work, in warm weather, it is better to dry him in the open air, by walking him slowly about, than to take him at once into the stable, possibly many degrees colder than the external atmosphere. Sudden checks are thus avoided; and he will also have time to recover his wind, and consequently be less likely to sweat in the stall.

*Bathing.*—In this country horses are seldom bathed, but it is the custom in Prussia to attach to the cavalry barracks a capacious basin for swimming the horses in. In summer time this is used nearly every day. During the hot weather it cools and cleanses the skin, and contributes to maintain the horse in a healthy state. When in Egypt, I frequently ordered large numbers of sick and healthy horses to be bathed in the Red Sea or the Nile, which practice was constantly attended with the most salutary results.

*Fomenting, Bandaging, &c.*—Fomenting is a remedial measure often called into use in the stable. Before the shoulders of young harness horses are properly hardened to the collar, they often become heated without being positively galled. In such cases a fomentation of common salt dissolved in tepid water

forms a general application. It tends to reduce the extra vascular action of the parts, and prevents worse consequences. Fomentations are likewise judiciously applied to the legs after excessive labour. Sponge or flannel, dipped in hot water, and used in this way, may be the means of giving great relief to the overwrought tendons and ligaments, and prevent many an unsightly tumefaction. Occasionally fomentations for the legs are medicated; but this is unnecessary, as warm water answers every purpose: strips of linen, cotton, or flannel, four or five yards long and about a hand wide, are used to bandage the legs. Sometimes they are applied wet, at others dry—according to the object in view. When we desire to fine the legs by mere pressure, a dry coarse holland or canvass bandage (the thinner the better) answers the purpose, without heating the legs. Dry flannel bandages serve best to sustain the temperature of the extremities in cases where the circulation is languid, or during the attacks of disease. They are to be put on immediately after hand-rubbing. Wet cotton or flannel bandages are excellent stable articles. They are employed to abate inflammatory action about the fetlocks and back-sinews after hard work, and act principally by reducing the local temperature by the constant evaporation carried on from their surface;—consequently, to be beneficial, they must be kept wet; for if allowed to become dry, their presence does absolute injury, by preventing the natural radiation of heat from the parts they surround. Bandages may be soaked in warm water when they are intended to act derivatively, and in cold when a revulsive or a stringent effect is desired.

The stable custom of stopping the feet with some moist substance cannot be too highly recommended. The only exceptions to its beneficial operation are in cases where the soles are flat, thin, or abnormally

convex. Egyptian horses are shod with the Arab shoe, which is a flattened plate of iron covering the entire ground and surface of the foot with the exception of a small hole in the centre. While the horse stands in the stable, moist soil or dung is forced through this hole, and filling the entire space between the sole and shoe, serves to keep the foot constantly in a cool, soft, and elastic state. In no country in the world can the feet of working horses be seen in a more perfect state, notwithstanding the extreme aridity and heat of the deserts which they are very frequently obliged to traverse. I attribute this freedom from foot disease, under such adverse circumstances, to the feet being so completely and uninterruptedly stopped. Many substances are used for stopping the feet, amongst which are clay, cow-dung, and wet moss or tow. Clay is objectionable, from its liability to dry and harden by the warmth of the foot and to become impacted between the shoe and foot, bruising the sole when the animal is in action. Cow-dung is the most common and perhaps the best of all stoppings. Wet moss or tow is more cleanly, and forms useful stopping where cow-dung cannot be conveniently obtained. Mr. Cherry constructed for this purpose a pad of felt of considerable resistance. It is put into the foot wet, and fitting itself to the concavities of the sole, constitute a practical, scientific, and neat stable appliance. The hind feet seldom require stopping; the fore feet, however, should be stopped, nightly, throughout the summer season. It is more necessary at that time of the year, from the tendency which the feet then have to become dry, inelastic, and contracted. It is less requisite during the winter months; but whenever the horse stands for some days together in the stable his feet should be stopped.

*Trimming, Docking, Nicking, &c.* — The mane natu-

rally divides itself, and falls on both sides of the neck. Man has thought it more conducive to beauty to dress it on one side. It is generally made to incline on the right side of the neck. This was the practice of the ancient equestrians. Varro and Virgil give directions to that effect. Possibly the custom arose from their habit of mounting on the right side, that they might grasp the mane to assist them. We mount on the left side, but still continue to train the mane after the ancient style on the right. With paired carriage horses, sometimes the off-side horse has it inclined to the right and the other to the left, so as to present the mane of each on the outer side towards spectators. The practice itself is harmless, but it prevents the horses from changing sides at their work so often as they should do. Constantly driving a horse on one side is apt to produce roaring, from the constrained position of the head. Cobs and ponies frequently have their manes cut down to within two or three inches of the roots. What remains stands erect. This is called "hogging." The sculptures from the frieze of the Parthenon of Athens prove this to be an antique method of treating the mane. They further show that the ancient Greeks varied this species of unnatural and barbaric ornament, by cutting notches or portions equidistant from each other out of the hogged mane, so that the remaining hair bears some resemblance in outline to the embrasures of a Norman castle. The mane of the cart horse requires or obtains little or no trimming, but grooms almost invariably adopt the practice of plucking out a portion of the mane of the lighter sorts of horses, when it becomes, in their estimation, too long. To accomplish this, the mane is combed, and a few of the longest hairs are seized hold of and plucked out by manual force. This is rather a painful performance when attempts are made to tear out too many hairs at once, and some horses

evince a determined opposition to it. Occasionally the mane will not lie well; this the groom plats, and loads with small pieces of window lead, which soon reduces it to the desired inclination.

A great deal of stable art, skill, and taste, is dissipated in fruitless attempts to make the horse's tail more ornamental than it naturally is. Grooms cannot agree with the poet, who said, "Nature never made her works for man to mend." On the contrary, they think that the particular object of their attention is capable of great external embellishment. Accordingly, some artistic groom of the last century considered it a vast improvement on nature's fair proportions to deprive his horses of ears and tail, and rank and fashion eagerly adopted the barbarous innovation.* The former custom, cropping, has happily fallen into entire disuse; but the latter, docking, is still retained, though not practised to the same ridiculous extent as formerly. The tail was given to the horse both for use and ornament. It is supposed to facilitate his movements when turning at speed, as a rudder directs a ship, and it defends him from the annoying attacks of winged insects†, before whom, in some climates, without it, he would fall an easy prey.‡ But the excuses offered in defence of cur-

* It is related, that the first time George III. saw horses that had been cropped, they were driven by Lord Tommy Onslow, the prototype of our four-in-hand school. The King sent for him immediately, and expressed his anxious desire to obtain some of the *earless breed.*

† "In thy behalf the crest-wav'd boughs avail
More than the short-clipt remnant of a tail,
A moving mockery, a useless name,
A living proof of cruelty and shame.
Shame to the man, whatever fame he bore,
Who took from thee what man can ne'er restore,
Thy weapon of defence, thy chiefest good,
When swarming flies contending suck thy blood."
*Bloomfield's Farmer's Boy.*

‡ In South Africa, the hyenas are addicted to the nocturnal practice of biting off the tails of such oxen as fall in their way, in this manner

tailing this member is, that it heats the horse while at work, and is apt to soil the rider in dirty weather, and that being domesticated and housed, there is much less need of a long tail to keep off the flies.

The operation of amputating a portion of the tail, when performed *secundum artem*, is effected by a portable guillotine, called a docking-iron, constructed by instrument-makers for the purpose. After tying back that portion of the hair belonging to the stump intended to be left, and clipping away that from about the spot where the incision is to be made, a joint is searched for, and the instrument placed in juxtaposition. The force that will be required for excision depends greatly on the operator, for if a joint be judged with precision, the blade of the instrument will pass easily between the bones, but if the body of the bone comes under the edge of the knife considerable exertion will be requisite to cut through it. It is not safe in the adult horse to allow the bleeding to continue until it stops of its own accord. Torsion or twisting the arteries may be resorted to as a neat way of stanching the blood, but it requires considerable nerve in the operator when the horse is restive under the pain inflicted. The same objection applies to taking up the arteries with a ligature. The usual method employed by farriers is to sear the bleeding stump with a ring-shaped iron at red heat, pressing harder and burning deeper into the upper edge of the dock, in order to improve the carriage of the tail. Some powdered resin is sprinkled over the surface of the wound, and melted by a re-application of the heated iron. This deep burning of the skin at the upper rim of the stump does no good, and the melting resin may do positive harm; both together, from the severe

exposing them to the merciless assaults of swarming insects, which soon undermine their constitutions, and speedily hurry them into disease and death.

irritation they set up, often give rise to a fatal disease of the nervous system — tetanus or locked-jaw. Some breeders, by taking the colt when only a few months old, very unceremoniously perform this operation on the tail. The young animal is backed to a gate, upon the top rail of which his tail is rested, and then with a mallet and a large knife it is chopped off at a stroke, and without any steps being taken to arrest the hæmorrhage.

As it has always been regarded a point of value for a horse to carry his tail at some distance from his quarters, many attempts have been made to produce this appearance by art. The torturing operation of nicking was invented for this purpose. It is now happily seldom employed. The muscles depressing the tail were divided with a knife, and the tail strapped back or put into pulleys to prevent their re-union. It is very doubtful whether all the benefit is not derivable from keeping the tail exalted, and none whatever from the division of the muscles. On this account Mr. Stewart recommends placing the tail in pulleys without making any incisions. There can be no objection to this painless method, and it is possible that the expected good may spring from it. The peculiar manner in which an Arab horse carries his tail has for a long time excited admiration. It results from the form of the croup, which may itself be an effect of art continued for a long series of ages. It is possible that this deviation in the position and carriage of the tail may have been first induced by the invariable Eastern custom of keeping the tail shorn of its hair during the period of growth. The colt is docked early in life, and from that time the dock is kept constantly trimmed until the fourth or fifth year, or even later. This practice, by removing the weight of hair which tended to press down the tail during the colt's growth, has the effect of improving its permanent

position, and giving rise, in the course of many generations, to a slight deviation from the usual construction of this part of the frame.

The tail of the race-horse is worn longer at present than was formerly the fashion. The grooms have also an idea that cutting the hair quite straight and square at the bottom contributes to the beauty of the horse's appearance, though this opinion is not exactly in unison with the definition of the beautiful offered by Hogarth, Burke, and other men of taste. The same objection applies to the square trim of the short-docked horses. The switch tail is, perhaps better suited to the light sorts of horses: there is less formality about it, and it is sufficiently removed from the dirt. In former years it was the fanciful custom of the manège to tinge the hairs of the mane and tail of light-coloured horses with some dye; this was possibly in imitation of the Easterns, for the Arabs of the Hauran, at the present day, dip the ends of the tail and mane in a watery extract of the henna plant, which stains them of a red tint.

The heels are a part on which grooms like very much to display their taste and ability. Well-bred horses require no trimming whatever about the fetlocks, and but little is ever requisite for any other description of horse. The fine hair from the inside of the ears should never be cut away, as it exposes the thin skin of this part to the bites of blood-sucking insects and renders the horse shy about the head. The long and strong hairs which spring up about the muzzle and eyebrows are usually clipped off, but for what reason it is hard to divine. These hairs act as feelers, having sentient nervous fibrillæ terminating at their roots, which convey the impression received to the brain. Their presence may be the means of preventing many an awkward knock in the dark, by apprising the animal of the situation of objects which

he cannot see. To remove them from blind horses, for the same reason, is an act of positive cruelty. Some grooms carry their trimming propensities to such an extent as to cut away the eyelashes, a practice which, exposing as it does the eye to injury, should always be peremptorily forbidden by the owner.

*Clipping.* — Nimrod defined clipping to be "a bad substitute for good grooming;" but this is rather too condemnatory of the practice, for, in many cases, evident benefit has accompanied its adoption. To clip fine-haired or thin-coated horses is as superfluous as gilding "refined gold." It is also perfectly needless to practise it in the summer time, when the hair is almost invariably short; but the long, rough hair of the winter coat of horses, sucking up and retaining, as it does, so much moisture, to be got rid of by slow degrees, is a fruitful source of loss of energy and health, and of low condition. Its adoption, therefore, in such cases may be excused or even advocated. The water, with which the animal's hair is so frequently saturated, must be removed either by spontaneous evaporation or by grooming. If it be allowed to do so by evaporation, a great deal of the animal heat must be expended in vaporising the fluid, for before water becomes vapour it abstracts caloric from whatever approximates to it. Thus it is far better to be without gloves than to have on such as are soaking wet; and the bather experiences much less cold when wholly immersed in water than when his wet skin is exposed to the evaporating agency of a gale of wind, though the air may be several degrees warmer than the water.

*Breaking.* — That animals should inherit from their parents a portion of their natural peculiarities is a most interesting phenomenon. That the traits or habits which have been originally the product of education, and are therefore quite distinct from instinctive endowments, should be transmissible to the

offspring, is a fact of some importance to those engaged in training animals to particular purposes or employments. The existence of the transmissibility of artificial sensorial influences is readily exhibited among dogs. A well-bred, though unbroken, pointer dog, when first taken into the field, will often stand at game without any preliminary instruction, solely through the influence of mental habitude conferred by the progenitors; for the practice of pointing at game is purely a cultivated habit. The native dogs of Egypt, when by accident they come on a scorpion, evince the greatest fear and dread, by barking and howling, although they have never individually experienced the tortures of its bite. This dread must be inherited from their parents by some foregone experience, for the dogs brought from England do not show the like horror until they have been bitten. The progeny of animals trained to any particular purpose take most readily to the same course as their parents have been engaged in. The offspring of horses trained to the chase or other occupations, frequently evince a surprising aptitude for similar employments. They exhibit an innate tact for their engagements, and require but little instruction before they are perfect masters of their work. It is only by long perseverance that the wild zebras of the Cape of Good Hope can be rendered tolerably tractable. The natural wildness of their disposition appears to have become so deeply rooted by the uninterrupted possession of their liberty from the primæval ages of the world, that it is with great difficulty they can ever be broken. The same circumstances occur with the original wild horses of Asia, whose intractability of disposition seems inherent; while, on the other hand, the mustangs or feral troopers of the American prairies, springing from domesticated parentage, but a few generations re-

moved, are much more easily tamed and trained to the appliances of man.

The rules which should be adopted in breaking the horse are founded on similar principles to those now so beneficially employed in the education of children, namely, early training and gentleness. Much future trouble will be evaded by rendering the foal tractable early in life. With this view he should be mildly fondled, and accustomed to the presence of men before he is weaned. After that time the familiarities should be increased; he ought to be handled daily, haltered and led about, have his feet lifted, be rubbed down, and accustomed to be tied to the manger. For, as it was long since remarked, "care must be taken that when a breaker receives the colt, he be gentle, tractable, and fond of men. For he is generally rendered so at home by the groom, if the foal is made to understand that hunger, thirst, and irritation are procured by solitude, and meat, drink, and freedom from irritation, are procured by men. When these things take place, foals not only love, but long for men." *

All that is necessary to break an agricultural horse for draught, is to harness and place him in a team with a horse before and one or two behind him, letting him fall gradually into his work without the employment of any harsh usage. The bit placed in his mouth should be small and loose; to prevent extensive abrasion, it may be lapped round with cloth. Rough treatment should never be allowed, as he will the more readily learn what he has to do from the others' example, and his anxiety to perform his duty will rather require moderating than any additional impetus.

* Xenophon's Horsemanship.

The preliminary training of colts intended to be employed on the turf, the road, or the field, is in principle the same. Obedience ought to be inculcated more by firmness and patience than by operating on the fears of the young animal. "The gods," says Xenophon, "have granted the ability to men to inform others, by speech, what they wish done. A horse, however, cannot be instructed by speech; but if, when he does what you wish, you grant him a favour in return, and when he is disobedient, punish him, he will be thus trained to obey when necessary."*

Race-horses are trained while very young, but the usual age at which other horses are submitted to the breaker's hands is about three years old. At first their work should be proportioned to their strength and condition, many horses being permanently ruined during the process of breaking by the unnecessary severity of the lessons, before the joints, ligaments, and tendons have acquired sufficient resisting power. Severe breaking lessons, and early immoderate work, are the ruin of thousands of horses. To require immatured organs to perform the severities which adult

* The Duke of Newcastle's opinion on the same subject coincides with Xenophon's. "There are but two things that can make an accomplished horse, viz. the hope of reward, and the fear of punishment, which all the world are influenced by; and, as far as we know, God has no other means of exciting his people to virtue, but by the largeness of his infinite rewards, and the terror of the pains that are prepared for their crimes. A horse must be wrought upon more by proper and frequent lessons, than by the heels, that he may know, and even think upon what he ought to do! If he does not think (as the famous philosopher Des Cartes affirms of all beasts) it would be impossible to teach him what he should do. But by the hope of reward, and the fear of punishment, when he has been rewarded or punished he thinks of it, and retains it in his memory (for memory is thought), and forms a judgment by what is past of what is to come (which again is thought); insomuch that he obeys his rider not only for fear of correction, but also in hopes of being cherished."—*System of Horsemanship*, vol. i. p. 12. 1743.

constitutions can with difficulty support, must inevitably entail disease, and destroy the future vigour of the animal. When the headstall and cavesson are first placed on the colt, the only pace allowed should be the walk. His lessons should be progressive, not alone from the necessity of their being so in order that they may be the more readily received and remembered, but because they may be adapted to his bodily state as regards condition for work. Therefore, walking exercise for the first few days will be sufficient, and even that will frequently induce profuse perspirations, showing that it is a tax on the immatured powers of the colt. After a little time he may be lunged. The object of lunging is to teach obedience and to perfect the paces. Before the condition of the colt is established, the continuance of the lunging lessons should not be long or the rapidity of the pace too severe, nor the ground on which he is exercised too heavy. By degrees the pace may be quickened, and the lessons prolonged. It is usual to have a boy to follow him; but this is dispensed with by good breakers, as it is deemed more advantageous that he should be taught to slacken or quicken his pace by word of command. It is bad policy to hasten the process of breaking beyond the capabilities of the colt. A month is about the time generally occupied. The supply of food during the severities of breaking should be liberal. To improve the sensitiveness of the mouth, a large bit is selected, having barbels or players appended to it. This is put on daily for an hour or two, the bridle rein being buckled to a surcingle or roller, so as to bear rather tightly on the mouth. In this state he is "put on bit," as it is termed, by being turned in the stall and attached to the stall-posts on each side by the pillar reins. Some practical benefit is found to follow this rather cruel practice: it

not only increases the sensibility of the mouth, but it improves the carriage of the head.* When it is intended that the colt is to be broken for riding, the saddle is placed on his back for some days previous to allowing him to be mounted. The breaker should occasionally throw an arm over the animal's back, and press rather heavily on him, so as to accustom him to sustain pressure; when he suffers this without exhibition of fear, one of the stirrups should be let down considerably and the foot placed in it, so that the breaker may throw all his weight on the saddle. When familiar with this, he may be mounted, and taught the use of the reins, the whip, the heels, or the spur. On dismounting, the breaker should reward the colt with a handful of corn or green meat, as on all other occasions when he has exhibited docility or tractability. Severity in breaking often defeats the attainment of the desired object, and renders the colt permanently vicious; for if he be once induced to put forth his powers in opposition to the will of the breaker, he will rarely forget the advantage he possesses in animal strength over his antagonist. On this subject a writer on whom the cloak of Nimrod appears to have most worthily descended, remarks, that "boys, it is commonly said, will be boys; so will young horses be young horses. Like youth in mankind, they must have time to gain experience; and till they do gain it, they must be treated accordingly. Horses at best are but brutes; and no man can tell what their tempers may be when roused. But the tempers of young

* The lamented Sir Alexander Burnes, in his "Travels into Bokhara," notices a singular custom prevalent among the Toorkmuns, with the view of improving the carriage of their horses' heads. They confine them to a stable, with no other aperture for the admittance of light than a window in the roof, which, by inducing the animal to look constantly upwards, gradually improved the usual position of the head.

horses never should be roused if gentle usage will prevent it. They seldom or ever are in the hands of the dealer or man of judgment. It would be rather an extraordinary proceeding on the part of a dealer if he was purposely to frighten or irritate the temper of a young horse in order to ascertain what under such circumstances he would do.

"There can be no doubt, that of the numerous accidents we often see and daily hear of, as occurring to gigs, phaetons, and other vehicles, three out of four arise from want of judgment in the driver. He is not aware of what is likely to produce accident; consequently takes no steps to prevent it. He has probably no conception that a strap buckled too tight or left too loose will render a horse uneasy in his harness, irritate his temper, set him plunging, and finally kicking and running away. This horse might have been a week since bought of a dealer, might have been driven in a double or single harness, have always gone perfectly quiet, and always would have done so if common judgment had been used. This is all we have a right to expect from a high-spirited horse. He does not promise us to carry a phaeton or gig down hill on the top of his tail, or to be flayed alive by his harness from our carelessness. If any person wishes one that would permit this, I recommend the gentleman to a rocking-horse." *

*Breaking to Harness.* — When it is desired to break the colt for light draught, he is generally put for the first time into a double-break, so that he has a steady companion by his side. It is preferable to put the harness on inside the stable, where he is less likely to be alarmed at its strangeness. He should then be allowed to stand on bit for some little time to accus-

* Stable Talk, p. 196. *et seq.* Longman, 1845.

tom himself to the novelty of his trappings and situation. Nothing should be strapped or buckled too tightly about him. The bit should be a very mild one; a common snaffle being usually preferred at first, as its use frequently obviates jibbing — a common effect of a powerful lever curb bit. His collar should be made to open at the top, that he may not be unnecessarily alarmed by passing and repassing it over his head. When every thing is prepared, he is placed along side the break-horse in the break, the traces attached, and the pole-piece but loosely appended. He is then started, and suffered to fall by degrees into his work. After a few lessons in this manner he may be put into single harness. Here it is necessary to add the kicking-strap to his other trappings, and it is generally the custom to train him in a common flat-headed hempen halter put on under his winker-bridle, the end of which running to the eye of the bit serves as a good purchase for the groom, who runs by his side. Patience is here, as in many other situations of life, a great virtue. The colt must not be hurried. If he appears inclined to stand for a time, let him do so; nothing is so likely to make him a jib to force when he shows a disinclination to proceed. He will soon move of his own accord, and when he does, let him take whatever road he prefers; the breaks-man office being more of a passive guardian and director than a dictator.

*Pensioning.* — In terminating this portion of our work, it will be but a labour of love to call the attention of all wealthy and charitable fellow citizens to the subject of pensioning old and faithful equine servants. The feeling that such devoted slaves should not be altogether neglected in old age, when past labour, is not altogether a modern refinement. Plutarch moves us to it by such sentiment and language

as the following: — "Goodness moves in a larger sphere than justice: the obligations of law and equity reach only to mankind, but kindness and beneficence should be extended to creatures of every species; and these still flow from the breast of a well-regulated man, as streams that issue from the living fountain. A good man will take care of his horses and dogs, not only while they are young, but when old and past service. Thus the people of Athens, when they had finished the temple called Hecatompedon, set at liberty the beasts of burden that had been chiefly employed in that work, suffering them to pasture at large, free from any further service. * * * * We certainly ought not to treat living creatures like shoes or household goods, which, when worn out with use, we throw away; and were it only to teach benevolence to human kind, we should be merciful to other creatures." It is recorded of the celebrated philanthropist Howard, that when his horses became incapable of labour from age, they remained, for the rest of their lives, happy pensioners on his bounty. They enjoyed perfect freedom from toil, and a full supply of all that old age required. Several fields were appropriated to their use, and in each of which was erected a comfortable shed, to which they could resort in hard weather, where they were certain of finding the rigours of the season softened by a well-furnished crib of the best hay, and a manger of either bran and ground corn, or some other nourishing food. Other illustrious examples of the exhibition of charity and goodness to superannuated horses are happily not wanting, but still the barbarous and unfeeling practice of slaughtering old and faithful servants continues with many who have it in their power to act far differently, and set a laudable example to those below them. Burns never proved

his own innate worth and warm-hearted charity more plainly than in his "New Year's Salutation to his old mare Maggie."

"An' think na, my auld, trusty servan',
That now perhaps thou's less deservin',
An' thy auld days may end in starvin',
For my last fou;
A heapit *stimpart**, I'll reserve ane
Laid by for you.

We've worn to crazy years thegither;
We'll *toyte*† about wi' ane anither;
Wi' *tentie*‡ care I'll flit thy tether,
To some *hain'd*§ rig,
Whare ye may nobly *rax*‖ your leather,
Wi' sma fatigue."

* A gallon. † Totter. ‡ Heedful. § Spared. ‖ Stretch.

## CHAPTER VIII.

### SHOEING.

"He doth nothing but talk of his horse; and makes it a great appropriation to his own good parts, that he can shoe him himself."—*Shakespeare.*

"It is the term *elasticity*, however, which, by its exercise and use, will explain, like the principle of gravitation in the hands of the astronomer, nearly every thing that was before dark and obscure in the arts of the foot."—*Bracy Clark's Podonomy*, 2d edit. p. 68.

It will be found, on searching the records of ages now grey with time, that before the invention of a protective shield for the horse's foot, this animal was comparatively disregarded, and held a far inferior rank in the estimation of mankind to that which he at present occupies. Some of the nations of antiquity preferred the mule or ass, from the superior endurance of their feet, others the camel: in every case the animal being selected for its physical adaptation to the state of the soil and climate, and the particular labour demanded. Thus, previous to the discovery of horse-shoes to guard his feet from injury, he was almost useless, if not a burden, in rocky, mountainous countries. This reason, in all probability, induced Moses to forbid the use of the horse among the people of Judea. He is not even mentioned in the Decalogue, though the ox and the ass are. Amos (vi. 12.) speaks of it as a thing as impracticable to make horses run upon a hard rock as to plough up the same rock with oxen. "Shall horses run upon the rock?" Something similar may be gleaned from a

passage in Judges (v. 22.):—"Then were the horses' hoofs broken by means of the prancings, the prancings of the mighty ones."

It is curious and instructive even now to observe, wherever the horse is employed with unshod feet, the diminished sphere of his usefulness. In the Pampas of South America, where horses cost less than shoes for their feet do, they are consequently ridden without them, and constitute, on the plains, the only means of rapid conveyance. But, as the traveller approaches the rocky passes of the Andes, he finds his steed "quickly become tender-footed in treading over the sharp stones covering these tracts, and is soon rendered unable to walk."* Here the high-heeled and contracted foot of the mule renders him capable to withstand the attrition of a soil from which the horse is discarded as useless. The utility of the horse to man, before varying, circumstantial, and uncertain, has been confirmed, fixed, and extended, by the discovery of the art of shoeing.

It was natural that man, always having an eye to personal profit, viewing the great strength and speed of the horse abbreviated and decreased in effect by the unstable state of his feet, should endeavour to invent remedies to counteract these evils, and thus insure to himself the services of so powerful an ally. The first attempt seems to have been to harden and solidify the horn of the foot, so as to render it more dry and durable, in direct opposition to the present treatment of the feet, which is to soften the horn and render it more elastic. On the turf, with which nature has clothed the localities generally inhabited by the horse, the growth of the horn of the foot equals the wear — it is supplied as fast as demanded; but when he is compelled to traverse our common

* Miers' Travels in Chili, La Plata, &c., vol. i. p. 347.

gravel roads without any artificial defence to his feet, the attrition is increased, while, the growth continuing the same, he soon becomes lame from exposure of the vascular parts of his feet. If the streets of London are eventually entirely paved with wood, all those horses used exclusively in town, might, with great advantage, be employed without shoes. By this their feet would reassume the elastic play natural to them, the foothold would be improved, and a saving would result to the public of some thousands of pounds annually. Even if occasionally used for short distances on gravel roads, the feet would not materially suffer; for a horse with well-formed hoofs will travel from thirty to forty miles under such circumstances without detriment. Mr. Bracy Clark says he once rode a barefooted horse from London to Calne in Wiltshire (eighty-seven miles), within three days: he, however, took advantage of the greensward and sandy places by the road side. Xenophon, who served in the Grecian army, proposes a process to harden the hoof, which possibly was much older than his time. "The outside of the stall," says he, "should be as good as possible, and would strengthen the feet, if there were strewed here and there four or five cart loads of tapering stones, measuring a hand in breadth, and about a mina in weight, encompassed with iron braces, that they may not be scattered. * * * * Stones thus strewn, strengthen the hollow of the horse's hoof." * In addition, particular care was taken to keep the feet free from moisture, in order that their hardness might not be impaired. † Homer

* Xenophon's Horsemanship.

† "Moist and smooth stalls injure the hoofs, which are naturally good. It is also necessary that they be not moist, be sloping, and have sewers; and not to be smooth, to have large stones against each other, almost equal in size to their hoofs; for such stalls at the same time consolidate the hoofs of those standing on them." — *Xenophon.*

previously alludes to "brazen-footed steeds;"* the prophet Isaiah says, "Their horses' hoofs shall be counted like flint (v. 28.); and in the Book of Micah (iv. 13.) is found an analogous passage,—"I will make thine horn iron, and I will make thy hoofs brass." We find Xenophon, again, commending a previous veterinary author of the name of Simon, "for excellently remarking, that good feet are known by the sound; the hollow hoof struck on the ground," he says, "sounds like a cymbal." In later times, unguents were prescribed by Vegetius Publius, Columella, and others, with the object of toughening the horny substance of the foot. Roads of broad, flat pavement, were laid down to obviate the attritive effect of gravel stones. Thebes had its way-wardens, or officers, to superintend the repairs of the public roads. Both at the Herculaneum and Pompeii, streets are found paved with flat slabs of lava, procured from the neighbouring volcanoes. The Romans constructed paved roads of great length. They were generally elevated above the surrounding country, through which they passed. The Appian Way and the Via Æmilia may be cited as celebrated examples. Soleæ or sandals were used occasionally: these were made of various substances, and contrived to hook, clasp, or buckle on the hoof, somewhat on the plan of the horse-sandal suggested by Mr. Percivall, and used as a make-shift shoe by huntsmen and travellers of the present day. Both the Greeks and the Romans were in the habit of applying temporary soleæ to the hoofs of horses and cattle, who were injured by travelling, or for common service, composed of platted fibres of hemp. Olaus Magnus informs us that a somewhat similar practice prevailed in the north of Europe, even so late as the commencement of the sixteenth century, where cork

* "*The brass-hoof'd* steeds tumultuous plunge and bound,
And the thick thunder beats the labouring ground."
*Pope's Homer's Iliad*, b. xi. 197

or teil bark was matted together with small twigs for the protection of the feet of both men and horses.* From all this it is evident, that the invention of attaching an iron shoe by means of nails driven through part of the hoof was an event of great importance to mankind in extending the services of this desirable animal to countries where, without them, he would have been comparatively burthensome.

Considerable discussion has arisen as to the exact period of time in which horse-shoeing was invented; but this probably will never be satisfactorily ascertained. Vossius, and some other antiquarians, would induce us to believe that the ancients were acquainted with the art; but the great weight of authority bears in a contrary direction. Pegge, Beckmann, Beranger, and more recently Bracy Clark and Coleman, deny, with apparent reason, any remote antiquity to it. We are without any positive or substantial evidence as to when or where this useful art originated. It is one of those numerous social contributions to the common weal, the inventor of which sleeps without his due fame. There are no facts at present known which demonstrate its existence previous to the time of the Norman conquest of this country, and even then, and for a long time after, it was far from being generally practised. In the renowned arras of Bayeux, which was wrought by the ladies of Queen Matilda's court to celebrate the victories of William the Conqueror, no shoes are represented on the feet of the horses, though the figure of the bits, spurs, buckles, and other trappings are given with minute fidelity. The equestrian figure of the seal of this king, according to Speed's representation of it, is also unshod. Ducarel, in his *Anglo-Norman Antiquities*,

* "Transeunt homines et equi quasi super clypeos militares. . . . . Crates seu arcus levi ac lato subere, seu cortice tiliano contexos, pedibus propriis ac equorum alligant." — *Olai Magni, Gentium Septentrionalium Historiæ Breviarium*, l. iv. c. 13. Amstelodami, 1669.

notices the same peculiarity of this seal; but in those of subsequent kings the horses are invariably figured with shoes. The antiquarian Montfaucon has misled a great many inquirers into the antiquity of horse-shoeing, by conjecturing that a rust-eaten piece of iron found in the tomb of Childeric, a Frank king of the eighth century, might have formed part of a horse's shoe, as it was pierced with three or four holes. He has drawn an outline of a shoe, and places the fragment within that outline, of which it occupies about one third part; but it might with equal probability have formed some portion of the coat of mail buried with that monarch, or even a piece of corroded sword-blade, or any other weapon. It is probable that the custom of shoeing horses with iron shoes was first practised a little previous to the Norman invasion; for when that event took place it was by no means general. It was introduced into this country by William the Conqueror, who awarded the fifedom of the city of Northampton to one of his followers, in consideration of his paying a certain annual sum for the shoeing of his horses; and it is generally believed that Henry de Ferres or De Ferrers, who came over with him, received that surname because he was entrusted with the inspection of the farriers; the descendants of this De Ferrers, the present Ferrers family, still bear in their arms six horse-shoes. From that time it spread gradually over the whole of the civilised world. In Japan, however, they still use sandals made of matted straw which fasten round the fetlock with straw bands. They are soon worn out; but, costing little, are easily replaced. The Icelanders also were formerly in the habit of using portions of ram's horn as a substitute for iron; and the late Sir A. Burnes heard of a similar practice among the people of the valley of the Oxus, who shod their horses with the antlers of the mountain deer. After forming the horn into a suitable shape, they fix it on the hoof with horn pins,

and never renew it until fairly worn out. It is said that the custom is borrowed from the Kirghizzes.*

Shoeing, as Professor Coleman used to designate it, is "a necessary evil," for though it conserves the feet from too rapid wear, it frequently inflicts extensive injury on them. Amelioration of these ills can only result from a correct perception of the anatomical construction and natural functions of the foot. Among the most evident and important of these endowments are its elasticity and expansibility; the descent of its posterior portions; the angle which the hoof naturally forms with the ground plane; and the manner of its growth and wear.

*Elasticity* is a valuable property inherent to the horse's foot. There is scarcely a portion of this organ that is not highly furnished with it. The wall, the arching sole, the frog, and the condensed tissued cushion above it, all possess elasticity in a high degree. Indeed, the frog is no bad representative in colour, consistence, and mechanical resistance, of caoutchouc itself. Elasticity of the feet of animals, is an illustration of the simplicity with which provident nature has accomplished its designs. This physical property exists in the feet of most animals. "The elastic spring of the unwearied foot" is exemplified in the flexible arch of the bones of the human foot, the spongy sole-pads of the carnivora and of the camel tribe, the spreading, divided hoof of the ruminantia, and the elastic heel-cushions of the solipedes.

*Expansibility* of the foot is another mechanical function, following and depending on its elastic properties. It is consequently found in greater force where the elasticity is greatest,—towards the heels and quarters.

*The Descent of the Heels and Quarters of the Wall* is another important and evident property of the horse's foot: it can be readily demonstrated by

* See Burnes' Travels into Bokhara, vol. iii. p. 180.

leaving a small space between the heels and the shoe; while the foot is off the ground the interstice will be evident, but it disappears when the weight of the animal is thrown upon it. If we examine the upper surface of an old shoe just removed from the foot, we shall find other conclusive evidence of this alternate elevation and depression of the posterior portions of the wall. In spite of the constraint of the nails, the shoe will be found brightened and worn towards the heels by the incessant attrition of the hoof in its descent and play upon it, giving incontestable proof of the great force exerted. To this natural endowment I have before alluded, as contributing to sustain the weight of the animal by mechanical compression of the laminæ. If this function be destroyed by the shoe being so closely fitted to the heels as to prevent its exercise, considerable violence will be done to the internal parts of the foot. The attachment between the hoof and the coffin-bone will be endangered, or even partially destroyed, and the toe of the bone will press down and bulge the sole.

*The natural Inclination of the Hoof* presents other important practical considerations. Any great deviation from the normal obliquity of its outline is detrimental to the permanence and utility of the organ. The angle which the fore-foot, when in a natural state, forms with the ground, is nearly 32°, but the hind feet are usually a little more upright. The reason of this difference of angularity between the fore and hind feet may possibly arise from the fact, that the weight which impinges on the fore feet falls almost perpendicularly, while that falling on the hind feet, especially during progression, is directed from before backwards. The dissimilarity of inclination is made to meet the difference of the line of pressure.

*The Progress of Wear and Growth of the Horn* must not be overlooked in our attempts to preserve the feet in a healthy condition. In the natural state the chief attrition takes place at or near the toe; so also is the growth greatest in front; but when a shoe is kept perpetually on the foot, none of the horn can be worn down at that part; yet the growth continues uninterrupted. By this, an alteration is gradually made in the shape and inclination of the foot: it becomes longer in form, and deviates more and more from the perpendicular. The judicious horse-shoer will consequently see the necessity of removing from this part of the foot such a portion of the horn as may tend to restore and preserve its natural inclination.

*Frog-pressure* is another physiological question for our reflection. As the frog receives a certain degree of pressure when the foot is unshod, some attempts ought to be made to follow nature in her intention, being satisfied that that plan of shoeing which allows most freely of the exercise of the original functional endowments of the collective parts of the foot, will be found most beneficial to the animal, and profitable to his owner.

Numerous attempts have been made to preserve the *elastic and expansible properties of the feet* from molestation in shoeing. Among the most ingenious of these plans, is Mr. Bracy Clark's jointed shoe; but as it did not fully accomplish what was desired, its adoption was not general. The one-side-nailing method of attaching the shoe allows of the freest expansion of the foot that has yet been attained. The public are indebted to Mr. Turner, of Regent-street, for bringing this beneficial plan of shoeing into practice. It is called the unilateral shoe, and essentially consists of driving the nails only on the outside quar-

ter and toe, leaving the inner quarter quite at liberty, though protected by the web of the shoe.

*The descent of the heels and quarters* is provided for by placing a piece of leather or felt between the shoe and the horn of those parts of the foot. The interposed substance, by its compressibility, allows of the exercise of this necessary function. With the same view I have frequently employed plates of Indian-rubber. In 1839, I communicated to the public, in "The Veterinarian," the results of some experiments I had made with this substance, and suggested its general adoption, instead of leather soles. The superior elasticity of caoutchouc, as well as its great analogy in physical resemblance to the lower and posterior parts of the foot, would seem to recommend it to our notice. A due and healthy proportion of *frog-pressure* is obtained by the same means, and by the employment of leather or felt * in sheets cut to the shape of the foot, spreading over the whole of its under surface.

*Preparing the Foot for the Shoe.* — In removing the old shoes, it is only necessary to be careful that the clenches are cut away before the shoe is wrenched off; for if that be not done, part of the crust may be torn away with the shoe. The next questions are, what is to be cut away, and what allowed to remain? These will be answered by placing the foot on a level surface, and observing whether the toe has too great or too little perpendicularity. If the inclination approaches too closely to the vertical, the heels must be lowered; but if, as most generally happens, from the greater growth of the horn at the toe, the angle declines considerably from the natural inclination (32°), then it will be necessary to excise a portion of the horny crust at the toe, to reduce the

* "It were a delicate stratagem to shoe a troop of horse with felt."— *Lear*, act iv. sc. 6.

obliquity to the standard. This appears to be a rational way of deciding these questions, in consonance with the physiological laws that regulate the functions of the foot. It also decides as to the allowance or rejection of raised heels or calkins, and of thick-toed shoes. The paring of the sole is but slightly called for. It is far too generally overdone. If the sole be cut away so as to bend under the pressure of the thumb, it is certainly not well calculated to resist contusions and wounds, from stones or other hard or sharp substances; nor is it able to interpose mechanical resistance against contraction, which a more substantial sole would offer. Only so much ought to be pared away as it is evident nature has attempted to throw off by exfoliation. I am well aware of the benefit derivable from paring the sole down to the quick in inflamed feet; but such cases differ widely from general circumstances, and are no criteria to guide us. In pumiced feet and flat soles, none whatever of the sole should be allowed to be cut away by the farrier. The frog, from the readiness with which it can be usually manipulated upon, is almost invariably too much cut. The growth of the frog is much slower than that of other portions of the horn. It wears but slowly, even when allowed to come on the ground, in consequence of its elastic nature. When removed from ground pressure, the natural stimulus of reproduction being taken away, it is secreted still more slowly, and consequently cannot require slicing off, as is commonly practised by farriers. Another practice of the generality of horse-shoers, most fatal to the health of the foot, is that of notching out the inflections of the wall at the heels, where it turns to form the bars. The origin of this pernicious treatment is supposed by Mr. Blaine to have arisen "from relief being sometimes observed to follow the removal of these parts, in contraction of the foot, when

they press with great force on the frog. From this it becomes a principle in the minds of the smiths, that it is a salutary process to every foot; and as it leaves a momentary appearance of widened heel, it is not possible to convince them but that a *real* enlargement of the posterior parts of the foot is the consequence. It is hardly necessary to remark, that this practice is founded in the grossest ignorance, and that, instead of eventually opening the heels, it tends permanently to contract them, by weakening the bars: the practice should therefore, in every instance, be forbidden, except, as before mentioned, in cases where the inflected heels contract or '*wire in*' so much as actually to press the frog between the horny edges, when it is justifiable, to relieve the immediate pressure, by cutting out the binding portions of the inflections; but it is not to be forgotten, in this case, that the remedy is only palliative, and more permanent means should be adopted for the healthy expansion of the parts." *

Stable shoeing is generally objectionable, on account of the shoes not being properly fitted to the feet. The feet are in these cases fitted to the shoes, and not the shoes to the feet. At the forge, this is obviated, and the shoe more properly adapted. Applying the shoe moderately heated to the insensible horn does not appear to be so fraught with injury as some have imagined; for by such means a firm adjustment of it is readily secured. In the English system of shoeing, the nails are driven much higher up than by any other people; there is consequently so much the more danger attending its practice, and many more horses are injured by punctures from the nails. By the Eastern and Continental plans, it is hardly possible, from the oblique direction in which the nails

* *Blaine's Outlines, &c.* p. 543.

are driven, to pierce the sensitive portions of the foot.* The rasping of the crust after the shoe is fixed does harm if carried towards the coronet, as it removes the natural cortex of the hoof provided by the frog-band, which, at its upper edge, unites the hoof with the skin. Therefore, this ornamental but useless process of outside rasping should be practised with care, or not done at all.

Horse shoes are constructed of multitudinous shapes. The form of the common English shoe is nearly flat on both sides; but wherever the least attempt is made towards an improved state of things, the concave or seated-shoe is used, having generally a fullered groove for counter-sinking the heads of the nails. On the foot surface of the shoe a good level bearing for the outer rim of horn is provided; but all that is likely to be opposite to such parts of the foot as are not intended to bear pressure is bevelled away. This form of shoe prevents the lodgement of small stones or gravel between the shoe and the sole. It is usually fastened on by eight or nine nails driven rather closer to the heel of the outer than to that of the inner side. The shoe should not be cut off too short, but allowed to reach rather beyond the point of junction of the crust and bar, so as to admit of the heel resting fully upon it: beyond this, it is not necessary to carry it, as it might possibly, if too much elongated, be torn off by overreaching of the hinder foot, which would not only dislodge the shoe, but seriously endanger the safety of the animal. Professor Coleman

* Horse-shoers are responsible for injuries done in shoeing, if they arise from unskilfulness or neglect. In Scotland there is a special legal enactment on the subject, passed in the reign of James III. By it every farrier who wounds or pricks a horse's foot through ignorance or drunkenness is compelled to deposit the value of the horse with the owner until he becomes sound, and also furnish another to perform his duty while he remains unfit for work; and in case the horse cannot be cured, he forfeits his value to the owner.

gives the following weights as proper for their respective purposes :

| | lbs. | oz. |
|---|---|---|
| Each shoe of a large draught-horse should weigh - - - - | 2 | 10 |
| Of a small draught-horse - - | 1 | 10 |
| Of a large coach-horse - - - | 1 | 10 |
| Of a small coach-horse - - - | 1 | 4 |
| Saddle-horse - - - - | 1 | 4 |
| Racing plates about - - - | 0 | 5 |

The farrier, in order to fix the shoe more securely than nails alone can do, hammers out portions of its upper edge, so as to have an embracing stay to prevent dislodgement. These are called clips. At or near the toe they offer useful support to the nails, and prevent too great stress being thrown on the clenches. To the shoes of heavy horses they are almost indispensable. But when clips are drawn out too close to the heels on both sides, they effectually prevent the ordinary expansion of the foot, and place the organ in most unnatural and destructive constraint.

The hind shoes differ in construction from those before: they are made stouter at the toe, straighter at the quarters, and, in addition, generally have the heels turned up to form calkins. In some parts of Holland the heavy horses are shod with enormous calkins at the heels, and knobs at the toes, all round, so that they almost appear to be going on pattens. When calkins are used, either behind or before, care should be taken that both heels have the same level; for if the weight fall unevenly, it will strain some of the joints of the foot or fetlock. The hind feet are less liable to disease from concussion and improper shoeing than those before. Less care is taken with them, and the nails may be driven nearer the heels without danger of injury. The hind feet have greater pressure to resist during exertion, but bear less

weight generally, and are subject to less concussion than those before.

*The Hunter's Shoe* differs slightly from the seated shoe in order that it may not be torn off when the animal is galloping on heavy soils. With this object less space is left between the foot and shoe than is otherwise done, and the heels are also cut considerably shorter to prevent the shoe from being torn away by over-reaching in a clayey country.

*Anti-slipping Shoes.* — Since the introduction of the wood pavement for the Metropolitan streets, numerous suggestions have been made to overcome its slippery nature by some modification of the shoe. Mr. Rodway's patented plan appears to act pretty well. It is nothing more than a concave-faced shoe; the concavity filling with dirt interposes a rough substance and prevents much slipping. Mr. Powell has also patented an anti-slipping shoe, the principle of which differs materially from Mr. Rodway's. It is intended to present a sharp surface to the wood, which is thought will have the desired effect. I cannot speak of its utility, as I have not yet seen it applied. If London were completely paved with wood, many thousands of horses might be worked all the year round entirely without shoes, greatly to their own ease and benefit, and to the pecuniary advantage of their owners.

*The Bar Shoe* is the common shoe with a bar or web of iron carried over the frog and making a connection between ends at the heels. This form of shoe is applied only as a remedial agent in pumiced or other diseased feet. By its employment the farrier is able to relieve the diseased parts from pressure, and throw it on such places as are better able to bear it.

*Three-quarter Shoes and Tips.* — A three-quarter shoe is one which has the inner heel or quarter removed; and a tip is a shoe with both heels taken

away. These shoes leaving the heels and quarters unprotected, though at perfect liberty, are not usually adapted for road work, but are generally used when a horse is turned out to grass. The tip was formerly exclusively employed as a racing shoe; but, modernly, a light shoe called a plate has come into general use on the turf.

*Anti-cutting or anti-interfering Shoes.* — Many horses, from improper formation or weakness, are apt to cut or wound with the side of the shoe the fetlock of the opposite leg. This occurs most frequently in such as are narrow-chested, and who turn out their toes, particularly when they are forced a little beyond their natural power of speed. Cutting blemishes the animal and lessens his safety. Young horses, though well formed, when first forced backwards with a weight on them, are very subject to cut, from an apparent ignorance of the position of their legs and the novelty of the pace. The speedy-cut is more rare, and arises from a different cause. Speedy-cut is a contusion immediately below the knee, and is seen in broad-chested horses with high action. The usual remedy or preventive of cutting, is the employment of a shoe much thicker on the inside than on the outside quarter, having the inner web bevelled inwards, and the lower outside edge filed away. This form of shoe is an ancient* and useful application. By the outward inclination it gives to the fetlocks, it commonly prevents the defect. But there are cases in which this plan of shoeing is not followed with the

* Gervase Markham recommends a shoe of the same construction to prevent interfering. His words are: "First let it be turned round as the common shoe, for the perfect hooffe, and the outside of the shoe, of the self same flatnesse and thicknesse: but the inside of the shoe, almost from the toe to the heele, must not be a quarter of an inch broade, yet full an inch thicke or better, and it must be sette within the hooffe a quarter of an inch, or there about, and this kind of shoe will cast the horse's foote so much outward, that he shall hardly at any time touch."

usual benefit, and we are obliged to resort to other expedients. The late Mr. Moorcroft was the first to suggest a reversal of the above plan of shoeing as a remedy in these obstinate cases. He shod such horses with shoes having the outer quarter thick and the inner one thin. The same principle is applicable to those horses that cut behind. In such cases the shoe at the outer heel should be increased in thickness according to the degree in which he cuts. "The web of the shoe should gradually become thinner until it reaches the toe, which should be of the ordinary thickness, and from which it should slope off, and end in a tip in the middle of the inner quarter. This shoe, in point of effect, would be equally proper for the fore feet, were it not that in such horses as are used for the saddle, the fore feet, being more charged with weight than the hind ones, are much more liable to be injured, and a horse thus shod on the fore feet might go unsafe; therefore it is expedient to let the inner quarter of the shoe be thin, and reach to the heel, but the outer edge should be bevelled off, so as to slope inwards. The same kind of shoe is equally well calculated to prevent the speedy cut, observing to bevel off still more strongly the part which strikes, and not put any nails thereabouts." * This form of shoe I have frequently found to succeed when all others failed; but it is objectionable on account of the awkwardness of its appearance and the rocking and straddling gait it gives the animal. The *modus operandi* of this plan is, that it obliges the horse to throw more of his weight on the outer quarter, and compels him to keep his legs wider asunder during progression, and consequently prevents a renewal of the blemish.

* *The Veterinarian*, vol. ix. p. 45.

# CHAPTER IX.

## DISEASES, OPERATIONS, MEDICINES, AND MEDICAL TREATMENT, ARRANGED ALPHABETICALLY.

Ars veterinaria post medicinam secunda est. — *Vegetius.*

SOME of the ancients combined the study of human and brute medicine, thinking, by such means, to ensure a greater perfection in both: and it cannot but be regretted, as detrimental to the advancement of knowledge which all profess themselves anxious to forward, that so wide a separation should at present exist between these two branches of the same science. They are governed by the same grand principles influencing the animal economy; the laws of medical and surgical treatment are alike in both instances; the access, course, and subsidence of many of the diseases are identical; the operation of therapeutical agents sometimes similar, at others dissimilar; in either instance equally instructive, and calculated to reflect a double light on their properties and mode of action in each case. If empiricism ought to be avoided, and extended views of the operation of physiological and pathological phenomena commended, then is it profitable to follow the example of the old masters of the medical art, who ever disdained to confine their inquiries to an isolated member of the animate world. The general welfare of mankind demand that they should go hand in hand. Human medicine should counsel and direct the veterinary act, and the experience derived in alleviating the suffering of the brute tribes be reflected back to advance the parent science. The benefit which Jenner conferred on the human

race by the discovery that a little lymph-like matter of pustules appearing on the cow's udder was a preventive of small-pox, ought to be an exemplar and incentive to further research and experiment on analogous subjects. The prevention or cure of rabies is a valuable subject for the general attention of medical men, and it cannot be doubted that a systematic study of comparative pathology would lead to its eradication. Other diseases that are intertransmissible from man to brute, and brute to man, might become more manageable. Glanders is distinctly traceable from the horse to man. The same applies to mange, itch, or scabies, which are transferable from dogs, horses, and camels to man. The ophthalmia which attacked our troops in Egypt is exactly similar in symptoms and cure to an affection of the eyes of the sheep of this country. Wide-spreading human pestilence is generally, if not invariably, preceded by epizootics on the lower animals; and what warning and benefit might accrue from well-directed observations!

It is asserted that the first purgative medicine employed in human practice, hellebore, was introduced by Melampus, who discovered it had a similar effect on goats. A careful study of comparative pathology, and of the action of medical agencies, would not be unattended with good. By such a course, many of the existing anomalies both of human and brute medicine would possibly be satisfactorily referred to anatomical or physiological peculiarities of the animal. We might then ascertain why the salts of lead, as Dr. A. T. Thompson asserts, are innocuous on the dog (arising possibly from his power of complete vomition); why it should take but five grains of aloes to purge a man or a hog, and yet require as much as one or two drachms to have the same effect on a dog, and six or eight drachms for a like result on the bowels of the horse. The strychnos or vomic nut is poisonous to

dogs, rats, and many other animals; while hogs, goats, and the toucan tribe of birds eat it with impunity. How is it that the hog devours henbane and foxglove, and the musk ox feeds on the poisonous leaves of the Rhododendron dauricum? Horses eat monk's-hood (Colchicum autumnale) with impunity, and yet goats are destroyed by it; while they, in their turn, devour tobacco and hemlock without any ill effects. The American pheasant regales itself on the buds of the Kalmia latifolia without injury to itself, but its flesh becomes poisonous to man, even when cooked. Hedgehogs will feast themselves on cantharides, and white ants fatten on opium.

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## ACIDS.

*Acetic Acid*, or vinegar, is sometimes heated and mixed with water as a foment for strains or contusions; at others it is used cold, diluted, as a cooling lotion to tumefied legs, &c. It is not often employed as an internal remedy. Mr. James Clark relates a case of a horse dying from the administration of a pint of vinegar, though I have given more than double that quantity in a case of poisoning with lime without damage.

*Hydrochloric Acid*, as an internal medicament, has been supposed to act as a lithontriptic, or dissolvent of calcareous collections in the bladder; but few, if any, lithontriptic agents can be depended on.

*Nitric Acid.*—Externally, as a caustic or escharotic in canker and phagedenic ulcers. Some care is requisite in its application to restrict its effects to the parts intended to be acted upon.

*Sulphuric Acid* also is used as a caustic application to canker of the foot. Largely diluted with water, it

constitutes a useful wash in some forms of mange. When given internally, it acts as an astringent and tonic, the dose being from one to two drachms copiously diluted.

## ALOES.

The aloe plant grows wild in many intertropical countries. The aloe perfoliata is wild and common at the Cape of Good Hope. At Barbadoes and other West Indian islands the aloe is cultivated to a considerable extent for the sake of its extract or inspissated juice of the leaves, which is the only portion used in medicine. The aloes brought from the Cape, *the Cape aloes*, are much spoilt by ignorance and carelessness in preparation. Too much heat is employed: heat has a destructive effect on the extract, and converts it into a resinous substance. Cape aloes are cheap, but are generally discarded from veterinary practice, on account of the uncertainty of their action on the horse, the Barbadoes extract being used in preference.

*Barbadoes Aloes* are imported into this country in large gourds, and, when good, are of a dull brown or liver colour, having a strong odour somewhat resembling the smell of the human axilla. The best West India aloes is prepared by cutting off the largest and most succulent leaves close to the stalk: these are immediately put into tubs, and disposed side by side, in an upright position, that all the free liquor may drain out at the wound. This juice is then exposed to the sun in shallow vessels, and gradually evaporated down to the proper consistence.

Real Socotrine aloes are seldom offered at the drug sales. They are imported in too small a quantity, and at so high a price as to preclude their being used

in horse medicine. The Barbadoes extract is alone extensively employed by the veterinarian. The horse takes a large dose of this agent to produce catharsis. It also lies a considerable time in the alimentary canal before its effects are apparent; but still it forms a purgative that is at once safe and effective. Its action is manifested principally on the large intestines, more particularly the colon. White recommends combining aloes with soap as a purgative, in order to expedite their action; but he forgets that soap is a diuretic, and would partially divert the cathartic property. As a purgative, aloes is generally administered in the form of a ball; but when given in solution it operates more readily, and possibly with greater safety. A solution of aloes is generally kept ready prepared for use.

*Solution of Aloes.*

| | |
|---|---|
| Barbadoes aloes - | - four ounces. |
| Water - - | - one quart. |
| Spirits of wine - | - two ounces. |
| Gum arabic - | - two ounces. |

These ingredients are mixed together, and incorporated at a low heat. The dose will vary with the size and strength of the horse; but six fluid ounces will be a medium quantity. In smaller doses it will not act as a purgative, but as an alterative and nauseant, for which purposes it is occasionally given.

A compound tincture of aloes and myrrh is employed as a traumatic or application to promote the healing of wounds.

*Compound Tincture of Aloes and Myrrh.*

| | |
|---|---|
| Barbadoes aloes, in powder - | two ounces. |
| Myrrh, in powder - | - two ounces. |
| Alcohol - - | - a pint. |
| Distilled water - | - half a pint. |

Digest for a week or ten days, and then either pour off the clear liquid or filter the whole.

## ALTERATIVES.

This term is applied to those medicaments used to bring about a more natural and healthy state of the functions of the frame by a gradual and moderate action. A great deal of misconception is afloat among farriers and grooms with regard to the *modus operandi* of alterative medicines. They attribute to them a mysterious and occult operation, because no violent circumstances attend their exhibition; but yet, when regarded with attention, these agents evidently act upon laws known to govern the equine economy when under the influence of medical substances. The benefit which results from their employment is effected by an improvement of the bodily secretions and excretions, particularly those of the skin, bowels, and kidneys, or by giving an increased tonicity to the soft structures of the frame. Consequently the medicines given as alteratives may invariably be resolved into diaphoretics, laxatives, diuretics, or tonics, when given in augmented doses.

*The Diaphoretic Alteratives* are chiefly obtained from the mineral world. Black sulphuret of antimony, tartarised antimony, cinnabar, Æthop's mineral, sulphur, and calomel stand at the head of this class of remedies. Diaphoretic or skin alteratives are most usefully employed in surfeit, mange, hide-bound, farcy, and grease.

*Diaphoretic Alteratives.*

No. 1. Sulphuret of antimony - two drachms.
Precipitated sulphur - two drachms.

To be made into a ball with flour and treacle, and administered daily.

No. 2. Tartarised antimony (antimonii potassio-tartras) - one drachm.
Calomel - - - ten grains.

Either given as a powder in a bran mash or in the form of a ball made of the proper size and consistence with honey and flour.

*Laxative Alteratives.*—When slight affections are traceable to an impairment of the excretory functions of the intestines, attended with costiveness, the employment of laxative alteratives is called for. With this view, small doses of aloes, combined with ginger or other cordials to prevent griping, and diaphoretic medicines to act on the skin, are advantageously given in conjunction.

*Alterative Laxative Ball.*

Extract of Barbadoes aloes - one drachm.
Sulphur - - - half a drachm.
Black sulphuret of antimony - three drachms.
Cayenne pepper - - half a drachm.

Mixed and made into a ball with linseed meal and soft soap. Should the above quantity be too small, and no improvement perceptible in the excretions, the quantity may be doubled or trebled; but it is always secure to commence with the smaller dose.

*Diuretic Alteratives.*—By augmenting or improving the action of the kidneys, we remove superabundant fluid from the system, and improve the general health. Deposits of aqueous matter, as in swelled legs and heels, and other œdematous enlargements, are frequently absorbed by rousing the kidneys to increased activity. Nitre, in doses of from two to three drachms, dissolved in the water given to drink, is a frequent stable custom, and often attended with benefit.

*Diuretic Alterative Balls.*

| | | |
|---|---|---|
| Resin, powdered | - | one drachm. |
| Nitrate of potass | - | half a drachm. |
| Venice turpentine | - | one drachm. |

Made into a ball, and administered once a day, or every alternate day. Many other substances are given as diuretic alteratives: among the most valuable may be instanced cantharides; but the dose should not at first exceed a grain or two, and even then its action ought to be carefully watched. Digitalis may also be sometimes given with advantage as a diuretic alterative.

*Tonic Alteratives.*—When it is the object to improve the general tone of the system without the direct exhibition of stimulants and tonics, medicines which combine some of the preceding alterative properties with more tonic agents are given. In such cases many of the preparations from iron or some of the salts of copper will realise the desired object. Chyryata, gentian, and other bitters are also advantageously administered. Ginger, cayenne pepper, and pimento are frequently serviceable. Minute doses of arsenic operate as a powerful tonic alterative, but require careful management. And, lastly, it must not be forgotten that change of diet generally acts as a most beneficial alterative.

*Tonic Alterative Balls.*

| | | | |
|---|---|---|---|
| No. 1. | Subcarbonate of iron | | one drachm. |
| | Cape aloes | - - | one drachm. |
| | Chyryata, ground | - | two drachms. |
| | Ginger | - - | one drachm. |

Made into a mass with flour and honey, and administered daily.

No. 2. Black sulphuret of antimony, two drachms.
Cayenne pepper - - half a drachm.
Cantharides - - one or two grs.

Compounded and given as No. 1.

## ALUM.

The sulphate of alumina and potassa, a well-known compound of salt, is of common use, in the powdered state, in solution, or made into an ointment. On occasion it is employed as an astringent to foul sores, grease, and cracked heels. Burnt alum, or alum deprived of its water of crystallisation, differs but little in medicinal properties from the common salt. When alum is used in solution, the usual strength is an ounce of the salt to a pint of water. The ointment is made by incorporating in a Wedgewood mortar, one part of alum with three parts of lard. Occasionally solution of alum is used as a stimulant in inflammations of the eye, or given internally as an astringent in diarrhœa and other fluxes.

## AMAUROSIS.

Amaurosis, gutta serena, buck-eyes, and glass-eyes, are all terms of the same disease of the visual organs. In this complaint the eye looks fair, open, and without blemish, but on close examination it will be found that the glassy serenity of appearance springs from a loss of sensitiveness of the optic nerve, or its expansion the retina. There is no longer the alternate dilatation and contraction of the pupilary opening on the exclusion and admittance of light. That the sight is entirely lost, is shown by the cautious manner in which the horse steps, elevating his legs as

blind horses usually do in walking, and by the attentive motions of the ears, endeavouring to make up for the deprivation of sight under which he labours by catching every sound to direct him. It is incurable.

### AMMONIA.

The most important of the ammoniacal preparations have been applied to horse medicine.

*The hydrochlorate of ammonia* is sometimes used as a topical means of assuaging heat and inflammation; but unless the lotion, in which form it is employed, be applied immediately on the dissolution of the salt, no benefit can accrue beyond that derivable from fomentation.

*The sesqui-carbonate of ammonia* is a valuable internal diffusable stimulant. In cases of pneumonia, influenza, low and lingering febrile attacks, the carbonate of ammonia will be found a powerful remedy. When administered in repeated two-drachm doses it seems to recal the powers of life without the exciting effect of a common stimulant. Though in opposition to the theory of medical action adopted from human practice, the effects of this substance when used in the excited stage of fevers will be found highly beneficial and conduce to the speedy convalescence of the animal, I am inclined to think, that in horse and cattle practice, diffusible stimulants, such as ammonia, are not used early enough in the febrile attack. When the coloured races of mankind are attacked with fevers, it is found, from their greater laxity of fibre, that they require stimulating medicine much earlier than white people. A similar distinction, though increased in degree, ought to be made with respect to horses and cattle, when labouring under fevers. Their vital energy is still lower than that of the

negro, and they require a corresponding promptness of treatment. The best form of administering this remedy is by balls composed of ammonia in coarse powder, made up with palm-oil and linseed-meal.

*The liquor ammoniæ acetatis* (Mindererus's spirit) is made by adding the sesquicarbonate of ammonia to vinegar or diluted acetic acid until the acid is perfectly neutralised. Given in doses of from four to eight fluid ounces, it is a powerful restorative and febrifuge. Professor Morton assures us that this medicine, with the assistance of warm clothing, will act also as a sudorific, a medical result long a desideratum in veterinary practice, and of the utmost value in the treatment of disease. Mr. Percivall suggests the application of the liquor ammoniæ acetatis as a repellent lotion. For this purpose he directs the subjoined formulary: —

| | |
|---|---|
| Liquor ammoniæ acetatis, and Rectified spirit, of each | 4 ounces |
| Water | 1 pint. |

Mix. Keep the affected part constantly wet with this lotion.

*Liquor ammoniæ*, or solution of ammoniacal gas in water, is the basis of a liniment of a similar nature to farriers' oils. By mixing one pint of liquor ammoniæ with a quart of olive oil, a stimulating, rubefacient compound results, which is rubbed into the skin over indurated swellings, strains, bruises, or applied as a derivant in sore throat and bastard strangles.

## ANCHYLOSIS.

When high inflammation has been induced by over-exertion in and about a joint, a deposition of ossific matter is thrown out, so as to obliterate the

joint, and consolidate the bones entering into its composition into one immobile shaft. When this has taken place, and the inflexibility is complete, it is termed anchylosis. There are but few joints of the body that are not occasionally subject to this product of violent and continued work. Anchylosis of the pastern and coffin-joints is the most common. The fetlock-joint is not often attacked, and the knee and hock even less frequently. Sometimes the bones of the spinal column, about the last dorsal and the lumbar vertebræ, are anchylosed. This is revealed by an unwillingness which the animal (generally an old one) evinces to turn in the stall, or still more to lie down, or when down to get up. The treatment of anchylosis need not be dwelt on, as nothing can be done to remedy the evil when it is once established.

ANTHELMINTICS: *vide* VERMIFUGES.

ANTIMONY.

The metal antimony is the basis of the *antimonii sesqui-sulphuretum*, which is extensively employed as a skin alterative. It may be exhibited in large doses, even to an ounce, and is generally combined with sulphur or nitrate of potass, or both. When pure, but little caution is necessary in its administration; but as it is sometimes mixed with lead, manganese, and arsenic, a knowledge of chemistry is necessary to detect the adulteration.

*Antimonii potassio-tartras*, or tartarised antimony. As a veterinary therapeutic agent, much discrepancy of opinion exists as to the value of this compound. Its efficacy in human medicine has led some veterinarians to extol its merits in horse practice beyond what it deserves; on the contrary, others assert that

it has no action whatever on the horse. Enormous doses are said to have been given without any apparent effect. Still I think it is not without value as a sedative and relaxant. It has been recommended as a vermifuge in drachm doses every morning for six successive mornings, before the food is given; after which a dose of cathartic medicine is prescribed to clear the intestines.

As an external application, it is sometimes made into an unction with lard, in the proportion of a drachm to an ounce. When well rubbed on the skin, this ointment sets up considerable irritation, in the shape of pustular eruptions; but in unskilled hands it is apt to produce unsightly sloughs.

*The chloride of antimony* is sometimes used as an escharotic in canker, quittor, and grease.

## ANTISPASMODICS.

The principal spasmodic affections to which the horse is subject are colic and tetanus, and the remedies used to overcome the inordinate muscular contraction set up in such cases are chiefly sedatives, such as opium, camphor, belladonna, and hyoscyamus. Other therapeutic agents act as antispasmodics by exciting a different action, as the oil of turpentine, alcohol, nitric ether, and pimento.

## ARSENIC (*Arsenious Acid*).

This well-known poison proves to be, in small doses, a powerful tonic, but one that requires much watching. It cannot always be safely dispensed, for occasionally it is found to accumulate in the system until it acts suddenly with destructive effect. The

dose is from half a grain to ten grains. Many cases of farcy have been radically cured with arsenious acid, and it also appears to have a beneficial influence on glanders.

### ASTRINGENTS.

Astringents are such medicines as have a constringing action on the relaxed exhalents of the kidneys and intestines. Acetate of lead, alum, and catechu possess such an effect on the renal organs; and opium, chalk, kino, catechu, and starch restrain intestinal defluxions.

### BALLING.

Medicine is most generally administered to horses in cylindrical-shaped masses, of about an inch in diameter, two and a half inches in length, and an ounce or more in weight. When medicine is given in this manner, care should be taken that the mass is plastic, for if given when the balls have been suffered to become dry and inflexible, fatal results have ensued from the horse's choking. White knew two horses killed in this way. I recollect an instance in which a valuable horse was nearly destroyed by the groom's thrusting the ball down the animal's windpipe instead of the œsophagus, though he prided himself on the facility with which he could give a ball. It brought on inflammation of the lungs, severe and lasting. Nimrod mentions a horse of his own, who on receiving a ball brought it back through his left nostril. Drenches are frequently so returned. The best position for administering a ball is to back the horse in his stall, when the operator, drawing out

his tongue with gentleness with the left hand, passes his right hand, with the ball, close to the roof of the mouth, to avoid injury from the teeth, and places it at the root of the tongue. Generally there is neither difficulty nor danger in delivering a ball by the hand: all that is required is a little manual dexterity; but occasionally restive opposition is offered by the animal, when it is necessary to use a balling iron to protect the hand and arm from injury. This instrument should be well wrapped with cloth, to guard against its abrading the bars of the mouth. The open balling iron, which allows the hand to pass out by one of its sides, is the most convenient form for the implement. A balling-probang most ingeniously constructed, is sold by the instrument-makers. I have not had any experience of its general utility, but should suppose it particularly applicable to giving balls to ponies, colts, and narrow-mouthed horses. Some horses have a habit of coughing up the ball instead of swallowing it; in such cases distinction should be made between a designed cough and an involuntary one; in the latter instance, it will be both proper and safe to allow the horse to return the ball, but in the former the mouth may be kept closed by wrapping the end of the halter round the muzzle until the animal has swallowed. A mouthful of water will sometimes expedite the process. If medicines be intended to act on the stomach, it is best to give them in solution by drench. In severe catarrhal affections, when there is great soreness of the throat, no attempt should be made to give either balls or drenches. For the convenience of administration, balls are generally enveloped in paper, but it is necessary to add, that the paper should be thin and readily soluble. When wrapped in brown or thick absorbent paper they are apt to lodge in the œsophagus or gullet. If the paper be oiled before the ball is wrapped in it, it will not

only tend to preserve the consistence of the mass, but will the more readily pass down the œsophagus.

### BELLADONNA (*Deadly Night-shade*).

An inspissated extract from the leaves of this plant has been introduced into the veterinary dispensatory. It is highly spoken of by Mr. Mavor and other practical men. Its action on the horse is decidedly narcotic, diminishing muscular and nervous irritation by its direct sedative influence on the heart. In large doses it dilates the pupils, and the same effect is produced by smearing the eyelids with an ointment made from this substance. The dose of the extract is about two drachms, repeated at short intervals, in order to maintain its action.

### BLEEDING.

When the object is to abstract blood from the system generally, one of the jugular veins is almost invariably opened. Occasionally it is desirable to take blood from some outlet in close approximation to the part affected; this practice is termed local bleeding. In cases of inflammation of the eye, the *temporal artery* is sometimes opened, though the utility of the operation in such instances is very doubtful; at other times *the small vessels of the conjunctiva* are punctured with a lancet, so as to derivate immediately from the vascularity of the part affected. *The palatine vessels* are opened in determinations of blood to the head, from undue pressure of the collar, megrims, staggers, and in lampas. This is effected by plunging a penknife or lancet into the roof of the mouth, "in a *direct* line *across* the rugæ, *one inch within the mouth*, *exactly be-*

*tween the middle and second nippers.*" By adhering to this rule the artery is divided at its curve, and a considerable quantity of blood can be thus obtained. When the vessel is only partially divided by a longitudinal section, it is difficult to stop the hæmorrhage in any other way than by repeating the incision and completely dividing the artery.

*Bleeding from the foot* is frequently practised in inflammations of that part. An easy way of abstracting blood from this member is to pare down the sole with a sharp drawing knife to the quick, and then put the foot into a bucket of tepid water. In this manner a considerable quantity of blood may be abstracted. Another plan is to cut away the sole at its juncture with the wall of the foot at the toe, and then pierce the network of vessels making up the sensible sole. A great deal of blood may frequently be thus obtained; should it flow tardily, the tepid foot-bath will augment and prolong the current; this method is, however, open to some objection.

*Bleeding from the saphena vein.*— The large and prominent vein running obliquely up the inside of the thigh is occasionally opened by making an incision through its coats with a lancet or fleam.

When it is desirable to revulse blood from about the shoulder, *the plat or plate vein is opened.* This is a favourite operation among farriers in affections of other parts of the limb which they ignorantly refer to the shoulder.

*Bleeding from the jugular veins* is the most common method of extracting blood from the horse. The convenience of the situation, and the large size of these vessels, have caused them to be selected in preference to any other. In affections of the head, bleeding from the jugulars is essentially local bleeding, and in other cases of inflammation, it acts with great benefit through the sensorium on the system. These

veins, one on each side of the neck, run down the hollow formed by the edge of the levator humeri, and the mylo-hyodeus and trachea. The upper portion of the vessel is more superficially situated than the lower. After it passes the middle of the neck, in proceeding towards the chest, it is accompanied by the carotid artery, par vagum, and recurrent nerve. The coats of the carotid have been divided by unskilfully bleeding too low down. The jugular vein is generally opened by the common fleam and blood-stick, but the lancet is sometimes used by veterinarians for thin-skinned horses. A spring fleam is sold by the surgical-instrument makers, which answers the purpose tolerably well. It is usual to wet the hair over the part intended to be punctured, in order that it may lie close and parallel to the incision. If it be suffered to lie across the edge of the instrument, it will be necessary to cut through it, or some may be forced into the orifice, and give rise to subsequent inflammation of the vein. The vein may be prominently raised by pressing on it with the fingers, so as to impede the current of the blood. Near the head the jugular branches, the proper spot for the incision being about three inches below this bifurcation. It is immaterial whether the vein on the right or left side of the neck be chosen for the operation. That on the near side is most convenient for the operator, being right-handed; while the small cicatrix which is left is hid by the mane, if the opening be made on the off side. An assistant should hold the horse's head, and cover the eye of the side he is to be bled from. The operator, holding the fleam between the finger and thumb, in close approximation to the integuments covering the vessel, while the other fingers press on the vein below to raise it, with the other hand holding a blood-stick of moderate size he makes a blow on the back of the instrument of sufficient

force to carry its cutting portion through the skin and coats of the vessel. The incision being made, the flow of blood is kept up by the pressure of the receptacle of the blood on the vein below the orifice. The most common receptacle is the stable bucket, but a graduated tin blood-can is a far preferable utensil. The quantity abstracted must always depend on the size, disease, and diathesis of the animal. A small quantity taken away quickly from a large orifice, often produces a more beneficial effect on the animal, than the derivation of an increased quantity slowly through a small opening. Large horses labouring under inflammatory complaints may lose from five to eight quarts with advantage. The quantity taken from smaller ones will be governed by the age, and by the acuteness of the affection to combat which the blood is abstracted. In all cases, the pulse is the only unerring guide. Sufficient having been taken away, the edges of the orifice are brought together, free from the intrusion of hairs, and united by passing a pin through the wound as near as possible to the surface of the skin, taking hold of but little of the integument. By observing this rule, the blemish of a small permanent elevation of the cuticle will be avoided, as the lips will unite more in their natural position than if the pin were driven deeply or unevenly through the wound. A small compress of tow, or hair plucked from the mane or tail of the animal, twisted round the free ends of the pin, will effectually prevent further hæmorrhage, and finish the operation. The head is generally tied up for an hour or two, to prevent his displacing the pin by rubbing it against the manger.

Some morbid consequences result from immoderate or unskilful bleedings. The quantity abstracted may be larger than the urgency of the symptoms of the disease indicated, or than the animal in a state of

debility can replace. Bleeding is a powerful and valuable remedy; but often sadly misapplied and abused. By bleeding too low down, and forcing the instrument too deeply into the parietes of the neck, the carotid may be punctured. Local phlebitis or inflammation of the vein sometimes follows the operation, from some peculiar inflammatory constitutional tendency, or from the employment of a foul instrument. Horses suffering from mange are particularly prone to phlebitis. Fortunately, however, there is seldom any necessity of bleeding them, as venesection is almost invariably contra-indicated in mange. The admittance of air into the vein kills the animal, by stopping the action of the heart; yet I have frequently seen a considerable quantity drawn in without injury. Bleeding to syncope in the horse is a dangerous practice. The premonitory symptoms of approaching faintness are, an inclination to run back, a wisking of the tail, and an involuntary passing of the fæces. It is said that a horse bled to fainting is certain to die; but I once saw one bled to complete syncope which recovered.

### BLISTERS.

The basis of most blistering applicants used in European countries is the Spanish fly (*Cantharis vesicatoria*); but in America the *C. cinerea* and *C. vittata*, or potato fly, have been substituted with success, are said to vesicate more speedily, with less pain, and at the same time without any danger of acting on the kidneys and causing strangury. In China, the *Mylabris cichorei* has long been employed. In some parts of America, the root of the meadow butter-cup (*Ranunculus acris*) is frequently used as a vesicant. Blisters are mostly applied in the form

of an ointment; but are occasionally preferred of a thinner consistence. The employment of euphorbium and turpentine, as adjuncts in blisters, is hurtful, as they possess only irritating and not vesicating properties on the horse's skin. It is usual, previous to the application of a blister, to denude the part to be blistered of its hair, either by clipping or shaving it off. Such is only requisite when the legs are to be subjected to the action of blisters; for it is too protractive in cases of internal inflammation, when the vesicating application is to be made on an extensive surface with the utmost promptness. In these cases the ointment must be well rubbed into the hair. When the legs are subjected to the painful operation of blisters, not more than two of them should be laid under their exciting influence at the same time. Fatal instances of exhaustion from the irritating effect of blisters have frequently occurred when all the legs have been blistered at once. A little lard or palm oil is usefully rubbed into the bend of the pasterns, in order to shield them from the vesicating action. In inflammations, blisters produce their beneficial effects by setting up an opposing inflammatory action in the skin; but their counter-irritation, or antagonism, is lost, when the organ attacked is more irritable than the skin to which the blister is applied. Thus, inflammations of the eye and throat are not often relieved by blistering in their immediate neighbourhood, because the tissues of the eye and the investing membrane of the larynx are both decidedly more irritable than the skin. And, in addition, by blistering too near to a tissue under inflammation, the blood is determined to that part with increased force, and tends to increase the evil.

Some forms of compounding blistering applications are subjoined.

*Common Blister.*

| | | |
|---|---|---|
| No. 1. | Cantharides, powdered - | one pound. |
| | Palm oil - - - | two pounds. |
| | Resin - - - | one pound. |
| | Wax - - - | half a pound. |

The three latter ingredients are to be melted together, and the flies stirred in when the mixture is getting cool.

A still simpler formula is adopted at the Veterinary College, which in my opinion is objectionable, and unfit to be used in inflammatory disease on account of its containing turpentine.

| | | |
|---|---|---|
| No. 2. | Cantharides, in very fine powder, | |
| | Common turpentine, of each - | one part. |
| | Hog's lard - - - | four parts. |

Melt the lard and the turpentine together in a water-bath, and then add the flies, stirring until cold.

As olive oil has the effect of dissolving the active principle of cantharides (*cantharidin*), it forms a good vehicle of exhibiting it when wanted in a more fluid state. Such solutions are termed liniments or liquid blisters.

*Liniment of Cantharides.*

| | | |
|---|---|---|
| No. 3. | Cantharides, roughly powdered, | two ounces. |
| | Olive oil - - - | one pint. |
| | Liquor ammoniæ - - | half-a-pint. |

Steep the flies in the oil for a fortnight, and, after straining, add the liquor ammoniæ.

The following speedy method of making a blistering liniment is adopted from Professor Morton's useful work on veterinary pharmacy.

| | | |
|---|---|---|
| No. 4. | Cantharides, in powder - | one part. |
| | Olive oil - - - | eight parts. |

Digest in a water-bath for two hours, and then filter for use.

For raising a sudden blister, an acetous solution of the vesicating principle of the insect may be made by macerating for eight days two ounces of cantharides in half-a-pint of acetic acid. The vessel must be frequently shaken during the maceration, and when complete, the whole should be submitted to pressure, and the liquid strained and filtered for use. A French method of raising an instantaneous blister might possibly be of service; I have had no experience of its effects, and cannot therefore speak confidently respecting it. The plan adopted is, to shave off the hair to the extent required, and wet the skin with a rag dipped in highly rectified spirits of wine; when the skin is well saturated with the spirit, apply a lighted match or paper and set it on fire. The continuance of the flame may be regulated at will, and prevented from spreading by placing a damp cloth around the part.

## BOG-SPAVIN

Is a bursal enlargement of the hock, which, by impeding the current of the blood by pressure on the principal vein of the extremity, gives it an additional tumefied and distended appearance. On this account it is frequently called *blood-spavin*. It is an unsoundness. Among the remedial agents best calculated to alleviate this disease is long-continued pressure; but the part is exceedingly difficult to bandage. Repeated blisters and firing are sometimes had recourse to, but with little probability of effecting a radical cure.

BONE SPAVIN: *vide* SPAVIN.

## BOTS.

From the French word *bouts*, ends or extremities. Bots are the larvæ or grubs of the Œstrus or gad-fly. Reaumur was the first naturalist who scrutinised closely into the habits and economy of this remarkable insect, but to Bracy Clark we owe a great extension of our knowledge on the subject. The parent fly deposits the little yellow eggs by a viscid gluten on the hairs of those parts of the body that are within the reach of the horse's mouth, more particularly about the fore parts of the body. When the horse licks himself or his companions, some of these eggs find their way into the mouth, and thence to the stomach, where they are speedily hatched by the warmth of the animal, and attach themselves with great tenacity to its cuticular portion by two tentaculæ or hooks. Reaumur states that they will adhere to the finger so strongly by these hooks as to require considerable force to dislodge them. Occasionally the parent fly is seen attempting to enter the anus, in order to deposit her eggs there. I have repeatedly noticed this, and Dr. Gaspari has observed the same thing. Mr. Clark is of opinion, that their presence in the stomach acts beneficially, by stimulating its digestive power; but there is little doubt of their injurious effect when present in large quantities. Mr. Blaine has known them to be fatal. The late Professor Coleman instanced a case in which they had eroded the stomach and penetrated the diaphragm also. Reaumur had seen fatal results from the presence of large numbers of them, but supposed that a few would be innocuous. M. Vallisnieri counted 700 eggs in one fly, and relates that they were in all probability the cause of an epizootical disease that destroyed great

numbers of horses about Verona and Mantua, in 1713, for, on *post-mortem* examination, enormous quantities of these parasites were found in the stomach. Medicine has but little power on them.

## BROKEN KNEES.

A broken-knee usually excites considerable inflammatory action, and that independently of the joint-capsule being lacerated and the joint itself exposed; for, should it be more than a mere abrasion, the division of the parts being generally effected by a rough, irregular surface — the road, the wound assumes, in consequence, all the untowardness of a contused one, and in aggravation the air gains admittance to the serous bag lying immediately under the skin, for the purpose of secreting a fluid to prevent friction between it and the deeper-seated parts during the flexure of the joint; so that if the skin be completely dissevered, we have the ill which always accompanies the laying open of the bursæ mucosæ, as these secreting capsules are anatomically called. When a horse breaks his knees to the extent alluded to, a small quantity of serosity may be observed to escape from the wound, a circumstance which has led some persons incautiously to conclude that the true joint was laid open, and the joint-oil flowing. In such cases of *simple* broken-knee, the usual plan of treatment is to clear the part of grit and foreign substances by tepid fomentations, to clip away such portions of the divided integuments and loose fibrils of ligament as may be thought will retard the cure, or render the surface projecting or uneven when healed. This will be best performed by the veterinary surgeon, who from practice is enabled to judge to what extent excision will be necessary to perfect and expedite the

cure. If any of the series of joints of the knee be penetrated, the constitutional irritation will be still more severe, and the chance of restoring the animal to perfect soundness rendered less probable. The extent of the injury may be ascertained by probing the depth of the wound, and noticing if there be any discharge of the yellow, glairy fluid—the joint-oil. Should the joint-oil be flowing, we then judge of the comparative chance of restoration by observing which of the series of joints is pierced. The knee, in front, is a treble joint, and the motion of each articulation is not equal. If the joint be opened where there is the greatest flexibility, the danger will be correspondingly increased. In the upper joint, formed by the lower end of the arm bone and the superior row of knee bones, there is no extensive motion; in the lowest joint still less; the principal action being placed in the central articulation: consequently, if the capsule of the lowest row be penetrated, the prognosis will be most favourable; if that of the upper tier be the seat of inquiry, a less auspicious termination may be expected; and a still more unpropitious result may be anticipated if the middle articulating surfaces be exposed. When any of these joints are penetrated, the chief and immediate object is to close the opening. This is sought to be accomplished by plastic poultices, by moderate compresses, and by cauterising the orifice itself, together with the surface of the wound, so setting up a degree of inflammation and intumescence that will mechanically close the opening. At the same time the leg must be kept as free as possible from motion, and the general health of the animal attentively looked to. These are always cases of considerable danger, and such as require high skill and scientific tact in their treatment. When the discharge of synovia continues, in spite of the attendant's exertions to stop it, the suf-

fering of the animal will be excessive, and irritative fever often puts an end to his life. In other instances, though the constitution of the animal is sufficiently strong to withstand the exhausting effect of the accident, yet a deposit of bony matter obliterates the joint, and unites two or more of the rows of bones in enduring rigidity, so that the horse will remain incurably lamed. In favourable instances, when the flow of synovia is arrested soon after the occurrence of the accident, the treatment will be similar to that of other wounds.

## BROKEN WIND.

This disease of the respiratory organs sometimes presents itself as an hereditary disorder, or rather as the result of a bad formation transmitted from the parents to the offspring. Thus, such horses as have the chest of a narrow, confined description, together with a large and pendulous belly, are naturally predisposed to broken wind. Broken wind is more common in mares than in horses. It occurs chiefly in such animals as are greedy, foul feeders, and in those that are accustomed to be fed on bulky, innutritious diet, at long or irregular intervals. Horses are sometimes attacked with this complaint when at grass or straw-yard. Sharp exercise, or a gallop when the stomach is gorged, will produce broken wind. Few horses on whose diet and general treatment care is bestowed, ever go broken-winded. It attacks those that are neglected — alternately fed to repletion and then starved — rested and then immoderately worked. A peculiar dry, husky cough, almost invariably accompanies this affection. The mode in which respiration is performed is also singular. It is not only quickened and laborious, the nostrils being distended

to the utmost, so as to show a portion of the vascular membrane covering the septum, but there is a remarkable difference in the time and manner of inspiration and expiration. There no longer exists the due balance between the act of drawing the breath in and forcing it out. Inspiration is easy, while expiration is prolonged and difficult. The air appears to be forced out by a double effort. On watching the muscles of the flanks, it is evident that after the principal expiratory act there follows a second auxiliary effort, which continues and prolongs the process. Digestion generally appears to suffer in this complaint; there is constant thirst, and the horse is very flatulent. Many hypotheses have been framed to account for the appearances presented in this affection. Some have viewed it as proceeding from a rupture of the air-cells of the lungs, or a state of emphysema, though broken wind may exist without emphysema, and emphysema without broken wind. Others have regarded it as originating from a congested or hepatised condition of the lungs. Mr. Blaine defines it as a diseased alteration in the functional capacity of the bronchial tubular ramifications, but neglects to point out what that particular diseased alteration consists of. When seeking an explanatory solution of this question, we should not overlook the particular vital expansive and contractile power which the lungs themselves possess; a power of contraction quite independent of the muscular action of the parietes of the chest. Laennec thought this property arose from the circular fibres of the smaller bronchial tubes possessing an inherent power of contraction. That the lungs do possess this contractile force, is evident whenever a portion of their tissue is exposed to view during life. Broken wind may probably originate in a diminution or total loss of this function, so that instead of the lungs being able to assist in expelling

the air from the cells, an extra call is made upon the muscles of expiration. This explanation will satisfactorily accord with the double action of the flanks noticed in broken wind.

Broken wind may be prevented, but cannot well be effectually cured. Its treatment, when it has once set in, will be consequently only palliative. The causes which have produced it, will, if allowed to continue, tend to keep in activity all the worst features of the complaint. The causes which experience has shown to aggravate the disease are, overloading the stomach with bulky food; working on a full stomach; violent and sudden exertions; close confinement to the stable; an immoderate quantity of water; dusty hay; and foul feeding. If these injurious agents be avoided, and the horse manger-fed, only giving him a small quantity of hay, and that old and good, but little bulky food, a moderate supply of water, taking care to moisten his oats, and occasionally allowing him a few carrots, will all contribute to render him more easy in himself and serviceable to his master.

BUTTER OF ANTIMONY: *vide* ANTIMONY.

CALOMEL: *vide* MERCURY.

## CAMPHOR.

This substance has considerable influence on the equine system. In drachm doses, united with opium, it is a sedative and antispasmodic. Alone, or in combination with ammonia, it is a powerful restorative in fever. It softens the tone and diminishes the frequency of the pulse. When given for a continuance, it acts on the kidneys. It is poisonous in large

doses, producing delirium and convulsions. Applied externally, dissolved in oil or spirit of wine, it forms a common stimulant to strains, tumours, and callosities.

## CANKER.

Canker is a disease attacking the foot, particularly the sensitive frog and sole. It is a sub-acute, unhealthy inflammation of the vascular secreting surfaces of these parts. There is generally an offensive ichorous discharge, the parts are very painful, and cannot bear the pressure of the animal's weight; and there is an abnormal sprouting, fungous growth, of a soft, spongy frog and sole. These excrescences spring up with great rapidity, and often extend themselves with the inflammation to the surrounding portions of the foot, so as frequently to destroy a great part of its horny covering. This disease is most common in heavy horses, and such as have white and hairy legs; it frequently follows, as a secondary affection, some other lesion of these parts, as thrush, punctured or bruised sole or frog, corns, quittor, and even from neglected grease. It occurs most frequently in wet, undrained stables, and is supposed to be more frequent in summer than in winter. Moisture is regarded as a cause of canker; but moisture uncombined with heat will not produce it, while heat and moisture, acting in combination, are the most active exciting agents. An absence of the natural pressure to the frog, by the use of high calkins, is supposed by some veterinarians to be a predisposing cause of this affection.

The treatment of canker is tedious, and can only be undertaken by those well acquainted with the phases of the disease. The principal indications are to restore the natural secretion of horn, and to pre-

vent the disease from extending itself to the other tissues of the foot. These are best brought about by free excision of the fungous growths; by repeated escharotic dressings, or by continued pressure on the diseased surfaces; keeping the parts dry; and by a careful attention to the general health of the animal. A judicious constitutional treatment will often do more to expedite the cure than all the other measures put together. Veterinarians generally pay too little attention to the advantage that may be reaped from a constitutional treatment of local disorders both in this and other diseases. A course of laxatives, followed by tonics or tonic alteratives, will be found of eminent service in the cure of canker. Some of the following escharotics and stimulants are usually selected as local dressings: — Chloride of antimony, caustic potash, sulphate and acetate of copper, bichloride of mercury, and the nitrate of silver. Benefit is found to accrue from the alternate use of two or more of the substances employed; for if one only be adopted, the part soon becomes habituated to its use and insensible to its action.

## CANTHARIDES (*Spanish flies*).

This insect is miscalled a fly, as it is properly of the beetle tribe. It is the basis of blisters. (*Vide* BLISTERS.) The active principle of cantharides is separable from the other component portions in the form of colourless crystalline plates, designated *cantharidin*, which are soluble in ether and oils, but not so in water or alcohol. The internal employment of cantharides has been advocated and brought into general use by Mr. Vines, and it must be confessed that no equally valuable addition to the veterinary pharmacopœia has been recently made. When combined with

vegetable bitters, as chyryata, gentian, or quassia, it constitutes a most powerful and efficacious tonic in debility, anasarca, water-farcy, farcy, and glanders. The daily dose is from three to six grains of the insect in fine powder. Though cantharides act so powerfully as a vesicant on the skin, their action is by no means so energetic on mucous membranes, for it is said they may be chewed without much affecting the mouth. Cantharides speedily improve the appetite, and augment the force and volume of the circulating fluids. As much as fifteen grains is prescribed by some practitioners, but such large doses are apt to counteract the very effect for which they are given; and by inflaming the coats of the stomach, throw the horse off his food. Over-doses of cantharides will sometimes produce strangury and bloody urine. In such cases, demulcent and oleaginous drinks should be administered as soon as possible.

## CAPPED-HOCK.

The points of the hock and elbow are very subject to a similar disfiguring enlargement of the bursal bags lying immediately under the skin. These enlargements are soft, fluctuating, painless tumours, caused, in the majority of instances, by blows and bruises applied to the part. Kicking in harness or against the stall post frequently produces them in the hock; and lying on a badly paved floor is a fruitful source of them in both situations. That at the point of the elbow may arise from the pressure of the heels of the shoe when lying down. Unless very large, these tumours rarely offer any impediment to the utility of the animal. They are more a dissight than an actual inconvenience. To remove them, the usual plan is to apply a succession of blisters to the parts; occa-

sionally they are tapped and the fluid drained off, but this is esteemed a dangerous practice. If pressure could be conveniently applied, it is calculated to remove them in a safe and harmless manner; but unfortunately it is very difficult to bandage either of the parts. They frequently disappear of their own accord.

## CAPSICUM.

Capsicum pods are admitted among the veterinary materiæ medicæ, and form an internal stimulant of considerable activity. They possess no specific effect beyond that of a warm stomachic. Scruple doses may be given.

## CARAWAY SEEDS.

The essential oil which these seeds contain acts as an agreeable carminative and cordial, and serves to reconcile the stomach to more nauseating medicines. They are seldom given alone, but most frequently in conjunction with other restoratives. The dose of the seeds is from half an ounce to an ounce. White recommends the addition of twenty or thirty drops of the essential oil of caraway seeds to the common cathartic ball, but for general purposes it is preferable to use them in the bruised state.

## CASTRATION.

The practice of castrating the horse is of very ancient date. Strabo relates that the ancient Scythians, and Pliny that the Romans, employed castration in order to render their horses more tractable. At the present time, it is more generally per-

formed in this country than in any other, and chiefly with the same object. Castration acts with marked effect on the animal economy. In the horse it produces a sensible alteration of the external configuration, assimilating it more to the feminine character; it also modulates and softens the voice, and renders the temper more placid and docile. The time for its performance is entirely governed by circumstances. Whenever it is desirable that the fore-hand should approach in weight and figure the arched crest and loaded shoulder of the stallion, the time is protracted until the young animal has assumed a portion of these masculine characteristics; but if the fore-hand be wanted as light as possible, the operation is performed early in life. From this it will be evident, that among heavy draught horses early emasculation is not only not requisite, but that it does permanent injury to the usefulness of the animal, by preventing the acquirement of effective weight in the fore-quarters, which weight assists the horse in his muscular tractive exertions. In them it is not so imperative that castration should ever be performed; the only service that can spring from it is its ameliorating tendency on the habits and temper, and cart-horses are seldom so vicious as those of a higher breed. Race-horses are not often castrated, as they are generally required for breeding purposes. Castration, as a means of accommodating the form and figure to the future employment, is of most service in hacks, hunters, light-harness, carriage, and post horses, for in the generality of these cases experience has taught us that the fore-hand should be light and free. As a general rule, the danger to be expected from the operation increases with the age of the animal. It may be performed early in life without awakening the sympathies of the constitution, but that is not always convenient or judicious. The time of castrating

colts varies from the age of two months to two years, in accordance with the fancy or judgment of the breeder. The testicles are present in the scrotum from birth until the fifth month, about which time they are, by the retraction of the spermatic cord, drawn through the abdominal rings into the cavity of the abdomen, where they remain until the end of the first year, when they again descend into the scrotum. Occasionally, one of the testicles fails to reappear in the scrotum, being obstructed in its descent through the internal or external abdominal ring; in such cases, when the time comes for operating, only one of the testicles can be removed, and the presence of the other is afterwards evinced by the "*riggish*" habits of the animal. Some objection is justly raised against castrating before the colt has fully recovered from weaning, or in too cold or too hot weather. The seasonable period for castration is when the spring has fairly set in and the grass is plentiful, and yet before the appearance of annoying insects, or the accession of hot weather: but there is generally much difficulty in so timing the operation as to be free from every objectionable circumstance. The usual manner of operating is by casting the colt, and, grasping the testicles in the left hand to free them from their coverings by making an incision in the direction of their long axis sufficiently large to allow them to slip out. An instrument called "castrating clams" is then placed round the vessels proceeding from the testicles, to arrest the hæmorrhage when they are removed. The testes are cut away with a scalpel, or they are otherwise cauterised off by a hot iron with a cutting edge. The mouths of the arteries are then seared with a firing iron at a moderate heat, so as to seal up their divided ends and prevent the flow of blood. Another method of castration in general use among our continental neighbours, the French, by whom it is pre-

ferred, is the employment of caustic clams. It consists in partially laying bare the testes from their investing membranes, the integuments and dartos muscle being cut through, leaving the tunica vaginalis intact. Pieces of hollowed elder wood filled with a paste, the active component of which is corrosive sublimate, are then tied firmly on the outside of the peritoneal covering, over the vessels of the cord, and allowed to remain until the testes slough away. Castration by simple excision, as performed on the human subject, is inapplicable to the horse. Castration by twitching or ligature is employed occasionally by country farriers, but is very objectionable, on account of the pain and irritation that follow it. There are some hopes that all the benefits of emasculation, without the danger attending any of the foregoing operations, may be derived by simply dividing the pudic nerves. When these nerves are divided, no erection of the penis can occur, the sexual desire being at the same time greatly lessened, if not altogether destroyed. It remains for some practical country veterinarian to establish more fully the utility of this plan.

## CATARACT.

This is a common disease, affecting the deep-seated portion of the globe of the eye. It often succeeds specific ophthalmia or other inflammations of the eye, the lens or its capsule being the parts first attacked, but extensive disorganisation of the other portions of the eye soon follows. The operation of "couching" has been experimentally tried on the horse, but little advantage was found to result from it. There is so much difficulty in steadying the eye during the operation, that extensive injury to other parts is very

likely to be made during the struggles of the animal, and the withdrawal of the eye-ball by the combined action of the muscles is so forcible, from the fears of the animal, that the humours of the eye are very liable to be forced out.

## CATARRH.

Catarrh is the mild and usual form of common cold, and epizootic catarrh or influenza a more severe, wide-spreading, and intense variety of the same affection. Catarrh generally proceeds from sudden alternations of temperature. There is a watery discharge from the nose, and occasionally from the eyes. The lymphatic glands enlarge and inflame, and slight constitutional fever is present, accompanied frequently with coughing. In a day or two the thin discharge from the nostrils and eyes alters its character, and becomes much thicker and even purulent, but this always marks the wane of the disease. All that the veterinarian need do as treatment in common catarrh, is to attend to the improvement of the secretions, and to keep the inflammatory action down by a moderate antiphlogistic course.

## CATECHU.

An extract from the wood of a variety of the acacia has been long used for its internal astringent effects. When combined with opium and chalk, it forms a useful potion in diarrhœa and dysentery. It is also given in diabetes. Dose, one to two drachms.

## CATHARTICS OR PURGATIVES.

Purgatives are given to hasten the conditioning of horses as well as to restore them to health when diseased. When administered to improve the condition, two or three doses are given at short intervals. From the great length of the alimentary canal in the horse, cathartics do not act so readily as in the human subject. They generally take more than twenty-four hours to produce their effect. Superadded to the length of the intestines, the horizontal position of the trunk may possibly retard catharsis. Most purgatives act by increasing the peristaltic motion of the intestines, or by stimulating the secretion of mucus from the follicles of their internal coat. Laxatives are merely mild purgatives. It is customary, and highly proper, to prepare horses for the reception of purgative medicine by giving them one, two, or three bran mashes previously; but in cases of inflammation this is not always practicable, as we are then compelled to act more promptly. When a horse has been well mashed, a less dose of the cathartic will operate with much greater surety and safety than a larger one given on hard food. Super-purgation is easily produced in the horse, and it has been the death of thousands of them. Moderate walking exercise expedites the action of cathartics, but work or violent exertion during their operation has frequently caused death. When the medicine is working, the horse should not be exposed to wet or draughts, the skin should be kept reasonably warm by clothing, and the water allowed ought to be stood in the sun, or have the chill taken off by the admixture of hot water. The principal purgatives used in horse medicine are aloes, croton-oil, calomel, and linseed-oil. The substance most commonly employed for this purpose is aloes,

the others being only had recourse to on particular occasions, in which aloes is not so applicable. Aloes acts best when previously dissolved, or rendered soluble by minute division of its particles. Thus prepared, it operates more quickly and with less griping than when merely pounded up with lard. The cathartic mass recommended by Mr. Morton is highly efficient, and powerfully increases the activity of the aloes contained.

*Mr. Morton's Cathartic Mass.*

"Aloes, broken into small pieces, eight parts.
Olive oil - - - one part.
Treacle - - - three parts.

The aloes and oil are to be melted together in the bath [water-bath], and when removed from the fire, the treacle is to be added, stirring the whole together. The addition of the last may not, to many persons, appear a matter of much moment; but I have found that on it depends the consistence of the compound; for if long boiled (which is at all times objectionable in the formation of aloetic compounds), the treacle will render the mass hard and brittle."* Dose, from six to twelve drachms. In the above compound I prefer the substitution of good cold-drawn linseed oil for the olive oil, as I think it increases the cathartic effect, and still preserves its consistence. A few drops of the oil of amber added to each ball readily covers the smell of the linseed, and is considered to hasten the action of the aloes. Barbadoes aloes should invariably be employed in preference to those from the Cape, for though they are both the product of the same family of plants, yet being prepared in different ways, their properties

* Manual of Pharmacy, p. 35.

are altered. Heat, beyond a certain degree, about 200° Fahr., decomposes the aloetic body, and converts it into an insoluble resin, which is inert as a purgative, and produces a griping action on the bowels. If good Barbadoes aloes be prepared in the manner described above, and given after grass food or a preparation of bran mashes, four drachms of the aloes, contained in an ounce of the compound, will be quite sufficient, but if due preparation have not been given, six or even eight drachms will be requisite. No food should be given immediately on purgative medicine, but water with the chill off may be allowed *ad libitum*, as it tends to assist the dissolution of the ball, and expedites its action.

### CAUSTICS.

The hot iron, the mineral acids, the nitrate of silver, the sulphate of copper, the chloride of antimony, and the bichloride of mercury, are the caustics most commonly used. They act by decomposing the part to which they are applied, and in cases where unhealthy actions are set up, tend to destroy the morbid tissue, and often restore the part to its natural organism.

### CHALK: *vide* LIME.

### CHARCOAL.

Powdered charcoal is frequently employed to sprinkle on offensive, foul, discharging ulcers, to correct the fœtor proceeding from them. Some apply it in poultices, but it acts best in powder.

CHLORIDE OF LIME: *vide* LIME.

## CHYRYATA OR CHIRETTÆ.

An Indian plant of a powerful bitter nature, forming an excellent tonic and stomachic restorative. In daily doses of from two to three drachms, the efficacy of this drug is very marked. It agrees with the stomach much better than the metallic tonics, and is far more potent than any other bitter of the vegetable world. In farcy, glanders, anasarca, swelled legs, and other debile states, this medicine, alone or in conjunction with assisting remedies, will invariably be found serviceable. It may be given in infusion or decoction, or ground and made into balls, according to the caprice of the attendant or the indications of the disease.

## CLYSTERS.

Clysters are of great importance in veterinary therapeutics, for in urgent cases of inflammation purgatives fail to effect a speedy catharsis, and yet it is imperative that the bowels should be unloaded as soon as possible. In such instances clysters are resorted to as a quick and safe remedy. Anodyne enemata are employed in spasmodic affections, as gripes and tetanus; astringent clysters in super-purgation and diarrhœa; and nourishing injections are thrown into the bowels in prostration and the debile sequelæ of inflammatory attacks. There are three ways of administering a clyster, — by the ox-bladder and pipe, by the pewter syringe, and by Reid's patent enema pump. The last is by far the best, as by its means an unlimited quantity of liquid may be injected in a short space of time. The common laxative clyster is com-

posed of a gallon or two of warm water, with a handful of Epsom, Glauber, or domestic salt dissolved in it. A ley of soft soap is another frequent form.

*Astringent Clysters.*

| | | |
|---|---|---|
| No. 1. | Tincture of opium - | - half an ounce, |
| | Prepared chalk - | - two ounces, |
| | Boiled starch - | - two quarts; |

given twice or thrice a day. The subjoined example, suggested by Mr. Blaine with the same object, may be of service: —

| | | |
|---|---|---|
| No. 2. | Alum whey - - | - one quart. |
| | Boiled starch - - | - one quart. |

*Antispasmodic Clyster in Gripes.*

| | | |
|---|---|---|
| No. 3. | Oil of turpentine - | - two ounces. |
| | Assafœtida, rubbed down | - one ounce. |
| | Olive oil - - | - four ounces. |
| | Gruel - - | - three quarts. |

*Anodyne Enema in Tetanus.*

| | | |
|---|---|---|
| No. 4. | Tincture of opium - | - two ounces. |
| | Camphor - - | - two drachms. |

In either of the last two cases, eminent service has resulted from the substitution of a tobacco enema.

As strengthening clysters, gruel, broth, or starch, may be thrown into the intestines.

## COLIC.

*Spasmodic Colic, Gripes, or Fret.* — This is an affection of the muscular coats of the intestines, characterised by acute pain with occasional remissions, ac-

companied with flatulent distension, together with spasmodic contractions of those tissues of the bowels and of the sphincters of the bladder and rectum. It is a very common disease among horses. That these animals should have so great a tendency to spasmodic colic is ascribed by Mr. Bracy Clark, in his valuable "Essay on the Gripes of Horses," "to the vastness of the intestinal canal, exposing a prodigious surface to be acted upon by the food, and the extreme thinness of the intestines in the horse, in proportion to their magnitude, over those of the generality of animals: whence, from slighter causes, the process of chylification is more subject to be disturbed and suspended." The predisposing cause of gripes may be, an impairment or partial loss of the digestive power. The usual exciting causes are, drinking largely of cold water when heated, a change or an irregularity of diet, gorging large quantities of the artificial grasses, exposure to wet and cold, or indeed any thing that will depress the vital energy of the intestines either directly or by sympathy. Simple spasmodic colic is distinguished from enteritis, or the red colic of farriers, by the pulse not being at the onset implicated or altered in its character; by the suddenness of the attack, no premonitory symptoms being exhibited previous to the access of the disease; and by the occasional subsidence or remission of the spasm and pain. Coldness of the extremities is also present in inflammation of the intestines, but not necessarily so in colic. The symptoms of gripes are well known. The animal is suddenly attacked with pain referable to the abdomen; he evinces an inclination to lie down, and if allowed to do so, he will roll from side to side, frequently rising abruptly to shake himself; then, pawing the ground, he lies down and repeats the rolling, occasionally turning his head towards his flanks, as expressive of the seat of his

suffering, and when in great agony he bites his sides with considerable force. Then for a minute the pain ceases, but the paroxysm soon returns, a profuse perspiration covers his body, and all the evidences of acute agony are again and again repeated. If these symptoms be not relieved in a few hours, the disease runs on to inflammation of the intestines, and frequently destroys the life of the animal. Therefore the treatment of colic should be prompt. The disease is to be combated on one of two principles, — either by giving stimulants to excite and restore the natural action of the stomach and intestines, and so overcome the morbid impression, or by allaying the spasmodic action by therapeutic agents of an anodyne or antispasmodic character. The first course is the one most generally adopted, and the most successful plan of treatment. Doses of oil of turpentine, of tincture or decoction of pimenta berries or of common pepper, oil of peppermint, and such stimulants, will often relieve the animal. It will be more proper, as being safer, that these excitant remedies should be tried on the first access of the complaint, while the antispasmodic anodynes, as opium, hyoscyamus, camphor, ether, and tobacco, may be reserved until there is fear of the morbific action running on to inflammation. Bleeding, in the latter stage, is also a safe and valuable antispasmodic. The first two of the subjoined formulæ are stimulating gripe compounds, the latter partake of a narcotic nature.

No. 1. Spirits of turpentine - - two ounces.
Peppermint water - - one pint.

The turpentine is to be beat up with the yolks of three eggs before being mixed with the peppermint water.

No. 2. Tincture of pimenta - - four ounces.
Oil of peppermint - - one drachm.

| | | |
|---|---|---|
| No. 3. | Tincture of opium - | - two ounces. |
| | Camphor powdered - | - one drachm. |
| | Water - - | - one pint. |
| No. 4. | Sulphuric ether - | - two ounces. |
| | Tincture of opium - | - one ounce. |
| | Water - - | - one pint. |

Walking the animal about for a short space of time will occasionally be found serviceable to expedite the action of the stimulating remedies; frictions over the surface of the abdomen; saponacious and anodyne enemata may be thrown up after the hardened and impached fœces within reach have been removed. A favourite and very efficacious remedy for colic among the Arabs in Egypt, is to drench the horse with the water through which the tobacco smoke is passed in the *sheesha* or snake-pipe. This liquid is discoloured by a portion of the tobacco oil which it absorbs during the passage of the smoke through it, and from that it gains its powerful antispasmodic principles. Sometimes during the paroxysms the animal will pass a small quantity of urine at a time, giving evidence that the bladder participates in the extensive spasmodic action going on; but more commonly staling is regarded as a symptom of the abatement of the violence of the affection, since the spasmodic constriction of the sphincture of the bladder has become relaxed. Such is the ignorant confidence of some farriers in the value of this token of the cessation of the complaint, that they direct their entire attention to making the horse stale.

## COLLYRIUMS.

Collyriums, or eye-washes, are sometimes used in the diseases of the horse's eye. The manner of applying them is by gently everting the lids, and introducing a feather wet with the lotion between them.

*Antiphlogistic Collyrium.*

No. 1. Liquor plumbi subacetatis dilutas half ounce.
Rose water - - - two ounces.
Distilled water - - half a pint.

*Astringent Eye-lotion.*

Tincture of opium - - two drachms.
Sulphate of zinc - - ten grains.
Rose-water - - four ounces.
Distilled water - - four ounces.

COPPER — (*Cuprum*).

Two compounds, of which this metal is the base, are used in medicine,—the acetate and the sulphate.

*Cupri acetas*, acetate of copper, verdigris. This salt has been employed internally as a tonic, in doses of from two to three drachms, but its use is now superseded by more efficacious and less hazardous remedies. White gave half an ounce daily, for a considerable time, in a case of glanders, but without any effect on the disease or inconvenience to the animal; thus proving that this salt is less poisonous on the horse than on the human subject. Externally, it is, however, a useful detergent and escharotic to quittors, cankers, foul ulcers, and the callous edges of sores, its action being much milder than that of the sulphate of copper. Mixed with honey and vinegar, it forms an ancient compound known by the term ægyptiacum, which is used in thrushes, and in aphthous ulcerations of the mouth.

*Linimentum Ægyptiacum.*

Acetate of copper - - five ounces.
Honey - - - sixteen ounces.
Vinegar - - - seven ounces.

Boiled together until they are incorporated.

Another useful stimulating detergent for grease, cracked-heels, thrushes, and foul treads, may be made extemporaneously by mixing verdigris and tar, in proportions determined by the required activity of the compounds.

*Cupri sulphas.*— Sulphate of copper, blue vitriol. This cupreous salt has been much extolled as an internal remedy in glanders and farcy; and it certainly possesses considerable influence over them, though it cannot be regarded as at all approaching to a specific, even in the milder forms of these diseases. It is an efficient tonic, of more decided power than any other produced by the metallic elements; but it requires to be continued for a considerable time, and its action must be carefully watched.

Sulphate of copper may be administered by ball; but in such a form it acts with diminished certitude and efficacy, and but a small quantity can be introduced into the system. However, convenience sometimes dictates its administration by bolus, when the following formula and doses may be used.

*Sulphate of Copper Tonic Ball.*

| | |
|---|---|
| Sulphate of copper, finely powdered | half a drachm to a drachm. |
| Ginger - - - - | one drachm. |

Made into a ball of the proper size and consistence with linseed-meal and treacle.

When the sulphate of copper is given in solution, much larger doses may be prescribed without danger than in the solid form. Professor Sewell frequently gives to the amount of half an ounce to an ounce dissolved in water; the corrosive action being prevented by mixing it with some demulcent liquid, as gruel or linseed-tea. But even in such doses, its action is slow; for no decision as to its ultimate bene-

ficial effects in curing glanders can be come to under a period varying from six weeks to three months. Sulphate of copper is soluble in four parts of water at 60° F. Sulphate of copper is used in powder and in solution as an external stimulant in canker, grease, and other diseases of the skin of the extremities.

### CORDIALS.

From the indiscriminate use of horse-cordials by grooms, much evil frequently results. The practice is now happily falling into disuse. If cordials be ever requisite, it will be after continuous and excessive exertion, when the powers of digestion flag and require an artificial stimulation to restore their function. In such cases the more simple the cordial the better, and possibly there is none more efficacious than either of the following.

*Cordial Balls.*

| | | |
|---|---|---|
| No. 1. | Ground ginger - - | one drachm. |
| | Gentian - - - | one drachm. |
| | Flour - - - | six drachms. |
| | Essential oil of cloves - | six drops. |
| No. 2. | Carraway seed, powdered - | six drachms. |
| | Chyryata - - | one drachm. |
| | Ginger - - - | one drachm. |
| | Oil of cinnamon - - | six drops. |

To be made into balls with treacle or honey.

### CORNS.

The only similarity existing between corns in horses, and the abnormal thickening of the cuticle in the human subject of like name, is, that they both

attack the feet, and arise from pressure — further there is no analogy. In the horse, this disease is seated in that part of the sole of the foot which extends into the inflections of the heels, having the wall of the foot on the outer side, and the bar on the inner. When this affection exists, there is usually lameness, accompanied with extra heat, and tenderness on pressure, of the part attacked. Its presence is revealed by paring away the superficial portion of the horny sole of this part; the inflammation of the sensible sole having excited it to secrete horn, with streaks and patches of inspissated blood between its molecules. On cutting nearer the seat of the corn, the horn of the sole departs still more from its natural character; it is found soft, spongy, and enveloping a quantity of sanguineous ichor or semi-purulent matter. When once these perverted secretions become fully established in this part, it is difficult to restore the natural action. The horn of the sole will hereafter remain soft and pulpy, if not absolutely diseased, and the animal will always evince more or less tenderness from the unprotected state of the sensitive tissues. Therefore the farriers' saw, "once a corn always a corn," is not very wide of the mark. In the estimation of most practical men, corns are held to constitute decided unsoundness, and render a warranted horse returnable. The direct and immediate cause of corns is undue pressure on the vascular sole; and this is brought about, in the majority of instances, by a loss of the natural inclination or angularity of the foot. The toe has been allowed to elongate; the heels have also been lowered, so that the foot declines too much from the perpendicular, and an increased proportion of weight falls on the back parts of the foot. In this way, the inflected portion of the wall at the heels receives pressure from above in a direction nearly horizontal to its fibres, instead of perpen-

dicularly. On this account corns are but rarely seen in the hind feet; the more oblique direction of the line of pressure, together with the usual increased elevation of the heels by the calkins of the shoe, ward off this lesion. Corns are frequent in low-heeled, flat feet; and are more common in the inner heel than in the outer. But there may exist a considerable quantity of the wall at the heels, and yet from the "wireing in" or contraction, with a misdirection of the pressure of the superincumbent weight, violence is done to the sensative parts, and a corn ensues. Shoes allowed to remain too long on the feet are a frequent cause of corns, as they become indented into the solar surface of the foot, and press upon portions not intended to carry weight. With respect to the treatment of corns with a view to their cure or palliation, the chief indications are to relieve the pressure by the application of a bar-shoe, or a shoe of the common description hollowed or "laid off" over the seat of the affection; by restoring the natural inclination of the foot; and by the use of escharotic liquids to the secreting surface after removal of the horn, so as to stimulate an improved production of insensible horny sole. For this latter purpose the chloride of antimony applied with pledgets of tow, once or twice a week, will be found serviceable.

CORROSIVE SUBLIMATE: *vide* MERCURY.

## COUGH.

Horses, in common with other animals, are subject to coughs from irritation of the air-passages. Coughing generally attends common colds, bronchitis, and epizootic influenza. When accompanying a common cold, a few mashes, a little gruel, with a dose or two of laxative cooling medicine, will usually effect a cure. If the pulse be considerably increased in force and ful-

ness, moderate venesection may prevent further derangement, and expedite the restorative process.

*Chronic Cough* generally attends an extensive functional derangement of the respiratory organs which may have become settled on the animal. It is found in thick and broken-wind, and other abnormal states of the lungs, and in the advanced stages of glanders. Occasionally it exists as a sympathetic affection, from irritation seated in the intestinal canal, arising from worms, crib-biting, foul-feeding, and indigestion. If springing from these latter agents, the cause must, if possible, be removed, when the effect will cease without further trouble. In these and other similar instances, we should not expend our energies in futile attempts to cure disease by doctoring symptoms. The cause must be sought with industry, for when found, our future steps are simple. If cough arise from chronic disease of the aërating passages, the complete cure will be more difficult, scarcely repaying the trouble; considerable relief will however always attend a judicious plan of dieting. Dry, dusty food should be avoided; the stomach must not be overloaded with bulky, innutritious substances, so as to press on the diaphragm, and by it on the lungs themselves: the horse should be stinted of water before work, and the litter removed during the day, to prevent his eating it — a depraved habit, frequently attending such complaints as cause, by an interchanging sympathy, disorganisation of the digestive and aërating functions. Benefit will also result from moistening the corn previous to feeding, and by giving carrots in winter and a moderate quantity of green food in the summer.

### CROTON TIGLIUM.

The purging croton, the seeds of which (formerly called *grana Molucca*) yield the croton oil. This is

a drastic, griping purgative of great power, and only employable to accelerate the operation of other cathartic preparations, or when they cannot be conveniently administered. It is less nauseating than aloes, and is consequently of diminished service in inflammatory attacks. Twenty or thirty drops of the oil placed on the tongue, when it is impossible to get the animal to swallow any more bulky agent, as in rigidity of the jaws in tetanus, will produce purgation. At other times, a tincture, made by digesting one ounce of croton seeds in a pint of rectified spirit, can be readily introduced, by mixing about six fluid drachms with the animal's mash or water. Another method of employing this powerful cathartic is, to give from a scruple to half a drachm of the residual cake after the expression of the oil, made into a ball with linseed-meal; but as the cake is of very uncertain strength, depending on the degree of pressure to which it has been submitted, it is probably best to use the ground nut itself, of which the dose is three grains. The apparent discrepancy between the dose of the oil and that of the substance of the nut, originates from the fact of the active principle of the croton residing principally in the testa or skin of the cotyledons being but partially expressed with the oil. 100 parts of the kernels of the seeds yield about 60 of the oil, and 40 of the farinaceous matter.

The following list of the doses of this agent as a cathartic in the different methods it is given, may tend to prevent errors on the subject: —

| | |
|---|---|
| Ground nut - | - three grains. |
| Oil - - | - twenty to thirty drops. |
| Meal (after the expression of the oil) - | - twenty to thirty grains. |
| Tincture - - | - six fluid drachms. |

## CRIB-BITING.

This remarkable habit arises from a vitiated state of the digestive organs, brought on by confinement to the stable, foul feeding, eating musty oats, and mow-burnt, dusty hay. It never occurs at grass, but occasionally at straw-yard. When this habit is once acquired, it is seldom eradicated, except in very young horses. It is said to arise sometimes from imitation; but I think such is rarely, if ever, the case. Most veterinarians consider it an attempt to draw air into the stomach; but Mr. Blaine views it, and I consider with stronger reasons, as an effort to expel gas from that viscus. The animal catches hold of the manger with his teeth, arches his neck upwards so as to straighten the œsophagus and enlarge the pharynx by muscular extension, when a short, grunting noise is heard, accompanying a convulsive contraction of the muscles about the throat. A modification of this pernicious custom, termed "wind-sucking," is performed without laying hold of the manger, but is essentially only a variation of the same vice. Indigestion invariably accompanies crib-biting, of which it may be regarded both as a cause and a consequence. A crib-biter's coat is generally rough and staring, and he seldom carries much flesh. The bowels are usually flatulent, and by a continuation of the practice, the incisor teeth are worn and broken away so that he makes but a poor grazer when turned to grass. Mechanical contrivances have been had recourse to, in order to prevent crib-biting. A strap round the throat, with a short, thin piece of iron rivetted in the form of a cross attached to it, and buckled on so as to press upon the pharynx, is one method; another is a muzzle, that allows the animal to take his food, but effectually prevents his biting the manger.

## CURB.

This term is derived from the French *courbé*, curved. Curb is a ligamentary enlargement at the back part of the hock, about three or four inches from the point of the os calcis, arising from violence done to the annular ligament of the hock, or to the thecas or sheaths of the tendons passing over the joint, by some sudden exertion of the animal. Thus curbs frequently result from lunging, racing, leaping, rearing, abruptly stopping, so as to throw the horse on his haunches, and the like circumstances wherein sudden stress falls on the part. These strains are of frequent occurrence in young horses when submitted to too severe breaking lessons, as lunging on heavy land, before the strength of the ligamentous structures is fully established. As badly shaped hocks predispose the animal to curb, it is said to be hereditary; but its transmission arises solely from the mechanical construction of the joint. The existence of a curb is best detected by viewing the hock sideways. A curb is a cause of unsoundness; for if once this lesion has existed, the parts can rarely be restored to their pristine state, and a recurrence of the accident may be always feared. The treatment of curb does not differ from that of other ligamentary extensions. It must be borne in mind, that rest is absolutely necessary, and that as long as any degree of inflammatory action exists. The hair covering the part and for some distance round should be kept constantly wet with an evaporating lotion, until the subsidence of the inflammation. A dose or two of laxative medicine, with bran mashes, will expedite the progress to amendment. If the back part of the stall slope outwards, so as to keep this portion of the hock on the stretch, it should be raised, or a patten-shoe put on the foot of the diseased limb. A pat-

ten-shoe is nothing more than the common shoe with a movable piece of bent iron elevating the heels, and relieving the posterior parts of the extremity from extension. When the heat and lameness have subsided, stimulating applications are had recourse to; sweating blisters are daily rubbed over the affected part until considerable swelling is produced: this is allowed to subside previous to a repetition of the process. If this plan of treatment be found inadequate, more potent blistering compounds are repeatedly applied over the curb; blisters being generally found more efficient than the actual cautery.

## CYSTITIS.

Cystitis, or inflammation of the bladder, is not a very common equine disease. It is more frequent in horses than in mares. When present, the animal exhibits a constant desire to stale, and if the neck of the bladder participate in the irritation going on, the attempt will be ineffectual as the urine is then entirely suppressed. It is a very dangerous affection, demanding the most active antiphlogistic treatment, and all the appliances that the highest veterinary skill can suggest.

## DIABETES.

This disease consists in a profuse discharge of urine, occasioned by the animal's partaking of such substances as excite the kidneys to immoderate action. In rare instances diabetes occurs without apparent outward cause, and by its debilitating effect undermines the constitution of the horse and destroys his life. The common and simple form of the complaint frequently originates from feeding on new oats, new beans, and mow-burnt hay; or it may sometimes

arise from the too frequent or injudicious use of diuretics. Bleeding increases the affection if the horse be in low condition. Counter-irritation, by the application of blisters, is well calculated to augment the disease, for if the Spanish-fly become absorbed it will act irritatingly on the kidneys. Laxatives may be given in the early stage to improve the secretions of the bowels, taking care to exclude such agents as are likely to have a diuretic effect. To these may succeed astringents, such as opium, catechu, alum, bark, and the powdered leaf of the uva ursi or wortleberry, either singly or in combination. The following may be taken as an example: —

| | | |
|---|---|---|
| Opium | - | half a drachm. |
| Uva ursi | - | two drachms. |
| Catechu | - | three drachms. |

Dissolved in a strong decoction of oak or willow bark, and administered daily.

### DIAPHORETICS

Are such medicines as increase the natural exhalation of the skin; when more powerful, as to occasion sweating, they are termed sudorifics. Few, if any medicines can be said to act decidedly as sudorifics on the horse, but many are found that have a diaphoretic effect when properly assisted by warm clothing and diluting fluids. Among the most efficient of these are the liquor ammoniæ acetatis, antimonials, aloes, in nauseating doses, and camphor. A good local, mechanical sudorific, is a fresh sheep's-skin, which by preventing evaporation allows the vessels of the skin to unload themselves more copiously than under common circumstances, and the fluid thus thrown off being condensed augments and continues the diaphoresis.

## DIARRHŒA.

In this disease there appears to be a loss of the natural balance between the secretion and absorption in the alimentary canal, the former being in excess over the latter. Many horses are constitutionally relaxed or "washy" from mal-formation, having usually narrow chests, flat sides, tucked-up bellies, and in addition are badly ribbed. In these cases the semi-fluid fæcal matter is expelled by the mechanical action of the abdominal muscles. Diarrhœa often arises from intestinal debility and imperfect action of the liver. Changes in diet, and improper food, as new oats and hay, will occasion it. A wet skin exposed to cold and evaporation will revulse the fluids usually exhaled by the vessels of the integuments to the bowels, and so give rise to diarrhœa. Diarrhœa occasionally assumes an epidemic, virulent character among colts in hot seasons. In Egypt, in one breeding stud, belonging to Ibrahim Pacha, no less than nineteen foals died in the course of a week, out of twenty-one which had been dropped in that period. The treatment of this disease is not generally difficult, but occasionally obstinate and protracted cases occur. The line to be pursued will be indicated by ascertaining the cause of the complaint. If the diet be in error, medicines will be nearly useless unless that be changed. If exposure to cold have been evidently the cause, gruel, warm clothing, and antimonials will be found serviceable. If it arise from imperfect digestion, tonics may be exhibited; should the cause be intestinal debility, astringents will be of benefit. If the biliary secretion be deficient or vitiated, advantage will accrue from a course of mercurials.

### DIGITALIS.

The leaves of the common fox-glove (*Digitalis purpura*) furnish this most powerful medicine. Digitalis is a direct narcotic, and acts without the usual preliminary exciting effect attending other narcotics. Its operation is on the circulatory system. In cases of acute carditis, when the beating of the heart has been excessive, I have seen the chief, inordinate throbbing stilled in a few minutes by the administration of a small dose of digitalis. In such diseases as pneumonia and pleurisy, its continued use retards the velocity of the circulation, and gives a peculiar and favourable intermittency to the pulse. Messieurs Blaine and Youatt speak most favourably of it, and their opinions have tended to remove the prejudice previously entertained against it. Doses, averaging from twenty to sixty grains, made into a ball, and given alone, or in conjunction with other active remedies, as the peculiarities of the case may suggest, may be repeated at short intervals during the day. There is danger from over-dosing with digitalis, as its inordinate use so reduces the patient as to retard his convalescence, or lay him open to the attacks of other diseases. Digitalis acts as a diuretic when exhibited for a considerable period.

### DIURETICS.

Diuretics are such articles as increase the urinary discharge. The turpentines, resins, nitrate of potassa, and soap are the foremost on the list, but many other agents produce diuresis, although not usually ranked among them. This class of medicines is much abused by the indiscriminate use of those attached to the stable. The common diuretic mass adopted by the College is thus given by Mr. Morton.

*Diuretic Mass.*

Take of Resin, pulverized,
Nitrate of potassa, ditto,
Hard soap, of each equal parts.

Beat together, so as to form a uniform mass. Dose from an ounce to an ounce and a half. I however prefer the introduction of Venice turpentine, as it tends to keep the mass in a plastic state.

## DRENCHES.

Drenches are not so commonly used in horse as in cattle medicine. In some modifications of disease their use is particularly demanded. Whenever medicines are required to act without delay, drenches are indicated. The previous solution of the article given expedites its action. Aloes, and many other articles, act quicker when in solution ; sulphate of copper can be given in a larger dose, and in a safer manner by drenching than by balls ; in spasmodic colic, drenches of turpentine are most commonly administered ; and when vermifuge medicine is given, it is most efficient when in a liquid form. In drenching the use of the bottle should be discarded, and no other instrument allowed than the ox's horn. Veterinarians should generally calculate upon wasting nearly one quarter of the drench, and increase its strength in accordance.

## DROPSY.

In the horse, dropsies are generally the sequelæ of pre-existing inflammations. That of the chest (hydrothorax) results from pneumonia, and dropsy of the abdomen (ascites) follows inflammatory attacks of the peritonæum and intestines. In either case the fluid can be drained off by tapping the cavity which

contains it, and, in addition, dependence is placed on powerful diuretics, such as cantharides and digitalis, and on external frictions and warm clothing. Such remedies are pointed out by a knowledge that dropsy of any cavity depends upon a loss of the balancing power between deposition and absorption, either from an increased activity of the exhalants, or diminution of that of the absorbents.

### EMBROCATIONS.

Any external fluid application is an embrocation, and thus the term embrocation includes a wide range of remedial agents. Lotions are included under this head, but liniments are more properly smearing liquids. The common saline embrocation is composed of —

| | |
|---|---|
| Hydrochlorate of ammonia | - two ounces. |
| Vinegar - - | - one pint. |

This form may be modified into a cooling lotion by the addition of two ounces of nitrate of potash to a pint of water, omitting the vinegar. Evaporating lotions may be made by adding spirit or camphorated spirit to water, in the proportion of an ounce of spirit to eight of water.

Stimulating embrocations may be compounded of soap liniment and liquor ammoniæ — five parts of the former to one of the latter ; or by diluting the tincture of cantharides with soap liniment or camphorated spirits.

### EMETIC TARTAR, *vide* ANTIMONY.

### ENTERITIS.

Enteritis is an acute inflammatory disease of the muscular and cellular structures connecting the pe-

ritoneal and mucous coats of the intestines. It is called red colic by farriers, from the highly injected state of these tissues after death. If the internal or mucous coat of the intestinal canal be attacked with inflammation, *diarrhœa, or dysentery* will be exhibited; if the outward or peritoneal tunic be the seat of excited action, the term *peritonitis* is used to distinguish the affection, for peritonitis may, and frequently does, exist as a primary and distinct disease; enteritis does not, however, maintain so separate a character, but most commonly implicates the peritonæum in the inflammatory progress. The symptoms of enteric disease closely resemble those of spasmodic colic or gripes, but it is imperative that the medical attendant should be readily able to distinguish between them, as remedies that are serviceable in one complaint would be calculated to increase the other. Enteritis may be distinguished from colic by its more gradual access; by presenting febrile indications, such as an excited small pulse and coldness of the extremities; by the greater tenderness of the belly; and by the non-intermittence of the outward evidences of suffering. In enteritis the horse frequently lies down, but seldom rolls on his back as in colic. As the disease advances the pulse runs high, and has a wiry feel. The breathing is accelerated, and the membrane lining the nostrils high coloured. A profuse perspiration covers the body. The poor patient kicks and bites his belly and flanks; looks wistfully at his sides with signs of pain; stamps his feet; and shifts his position from side to side. The disease is rapid in its course, and if not checked the animal soon falls a prey to it. Cold sweats succeed as the powers of life decline, and the pulse becomes hurried and scarcely perceptible at the jaw; the energies of the animal are speedily prostrated, and death ensues. The most prevalent causes of inflammation of the intestines

are, exposure to cold; reaction after drinking large quantities of water when heated; the passage of food in an undigested state from the stomach to the intestines; hardened and impacted fæces; intussusception; and unfavourable terminations of acute indigestion and spasmodic colic. *Treatment.* — The most important agent in the treatment of this disease is bloodletting. Large and repeated quantities must be abstracted, until the pulse is beneficially acted upon. If the patient be young and strong, from five to eight quarts may be taken from a large opening as rapidly as possible. Back-rake, to remove the scybalæ, and throw up copious laxative enemata, followed by repeated injections of soap and water, or tepid water in which a small portion of opium has been dissolved. Apply mustard cataplasms to the whole surface of the abdomen, succeeded, if necessary, by blisters of cantharides. A pint of linseed oil may be administered, with or without gruel, as an aperient, which, if not effective, may be followed by a couple of drachms of aloes dissolved in water, with half an ounce of tincture of opium, every three hours. Meanwhile, attempts should be made to equalise the circulation by exciting the cuticular excretions, by warm clothing, frictions, and flannel bandages to the extremities. When the paroxysms pass off, and the bowels are opened, the strength of the patient should be supported by linseed tea, gruel, malt and bran mashes, and other simple and digestible articles.

### FARCY.

Farcy and glanders are both modifications of the same disease, but farcy is a milder form, and less dangerous to the life of the animal, as well as more easily cured than glanders. They are both diseases of the same vessels — the lymphatics or absorb-

ents, spring alike from the elimination of a virus or animal poison, and are generally connected with constitutional debility. Farcy may be regarded as an external or cuticular manifestation of the disease, while in glanders the more deep-seated tissues suffer. Farcy was formerly considered a disease of the veins, but that mistake is readily explained by the knowledge that the absorbents accompany the veins in their courses throughout the body. Thus the diseased enlargements of the absorbents, which occur in the track of the large saphena veins, on the inside of the thighs, were erroneously viewed as seated in the veins themselves; but the attack is confined to the accompanying absorbents. Farcy generally breaks out in those parts most remotely situated from the centre of circulation, as the hind and fore extremities, and the lips and face. In this country, I believe, the hind legs are much more frequently the seat of the disease than the fore ones; but some notes which I took of forty-six cases in Egypt, attacked with farcy about the same time, and which were sent in for treatment, would not show that there existed, in that place, the same peculiarity. Of that number, nineteen were attacked in one of their fore limbs, sixteen in one of the hind legs, two had it both before and behind, and nine, including two mules, were principally affected on the head and trunk. A mare, while suffering under this complaint, gave birth to a foal, which was perfectly healthy and remained so, but was not allowed to suckle his own mother. When the disease appears in the legs it is generally accompanied with œdema or dropsical enlargement of the limbs. Whenever any obstruction is offered by the valves of the absorbent vessels, the irritating lymph resting there produces a swelling ("farcy bud"), followed by unhealthy suppuration and ulceration of the coats of the vessel and the integument immediately covering

it (farcy sores and pipes). As the poison passes onwards through the lymphatic glands they exhibit an inflamed, indurated, and, ultimately, an ulcerated appearance. When this disease confines itself to the absorbents of the skin, superficial, circular eruptions are spread over the body; this form is termed by grooms and farriers the "button farcy." Canker and grease will sometimes run on into farcy. If farcy be allowed to proceed unchecked by medical treatment, it gradually implicates the deeper-seated lymphatic vessels, and contaminates the whole system. The inter-maxillary glands enlarge, tuberculous matter is formed in the lungs, the membrane lining the nasal cavities becomes ulcerated, and all the manifestations of glanders are established. *Causes.* — Farcy, like glanders, is rarely a contagious disease. However, when the matter falls on an abraded or mucous surface, predisposed to the reception of the disease by the debility of the animal, farcy or glanders is reproduced. It may be generated by inoculating greasy or cracked heels with the farcied sanies; but when an attempt is made to introduce it into the system of a strong healthy horse, it is successfully resisted. Farcy results from general debility, or appears as the sequela of other diseases. It is most common in young and old horses, either before the full establishment of the animal powers or when they are undermined by age. Insufficient food combined with hard work, and damp and ill-ventilated stables, are fruitful sources of farcy. *Treatment.* — The chief dependence in the treatment of this complaint is on constitutional remedies. Thus, as the disease is essentially one of debility, the food should be generous and tempting: — malt, and speared corn, and beans, with good clover hay, or tares and carrots, should be ungrudgingly supplied. The use of molasses has been suggested. The stable should be efficiently ventilated: as therapeutic agents,

tonics, and alteratives, should be given. Professor Sewell recommended a daily drench of six drachms of the sulphate of copper in solution with a little gum. The exhibition of the arsenious acid in minute quantities is sometimes attended with beneficial results. Other mineral tonics, as the preparations of antimony, zinc, and mercury, are also administered. Cantharides, combined with ginger and chyryata, possess powerful influence over this complaint, and possibly of all known remedies are most worthy of confidence. Bleeding, setons, rowels, and other discharges, cannot but do injury, increase the depression of the vital powers, and strengthen the disease. The cauterising budding-iron, at a red-heat, should be applied to the ulcers or farcy bud, as no other stimulant will effect so speedy and beneficial an action on them, for the majority of stimulating mineral powders tend to augment the ulcerative process. If washes be used, the lead lotion will be of more service than any other. Mr. Blaine has experienced beneficial effects, in long protracted cases of farcy, with enlarged limbs and œdema, from sea-bathing with daily doses of salt water. He also recommends the application of sea water as an embrocation several times a day. — *Blaine's Veterinary Outlines*, p. 394.

## FEVER.

Fever is occasionally a primary, idiopathic, and distinct equine disease, running its whole course in a simple synochial form; but more generally such manifestations are of short endurance, and from some idiosyncracy attached to the horse, it speedily degenerates into local inflammation of some important organ of vitality. Otherwise fever exists as a symptomatic attendant on original inflammation, and will be treated of under the proper heads.

## FIRING.

The employment of the actual cautery is of very ancient date. It is an important and powerful agent, though it has lately fallen somewhat into disrepute: other means, less violent and painful, have been introduced to effect the same ends for which the firing-iron was formerly the only remedy. The hot iron is generally employed as a counter-irritant in deep-seated inflammations about the joints of the extremities, though it is said, with truth, to possess other properties besides that of merely diverting a portion of the irritation going on to the skin. In Egypt and Arabia the heated iron is almost the sole native remedy for every equine complaint. A fine stallion was pointed out to me which was *said* to have been cured of glanders by being scored over the face with the hot iron. Firing may be divided into superficial, mediate, and deep. Superficial firing has scarcely more counter-irritant action than a good blister, with the disadvantage of being a permanent blemish. Mediate firing is more potent, and possesses a contractile effect on the skin, endowing that with a bandage-like action on the parts situated beneath. If the skin be penetrated, and the cellular tissue entered, as in deep firing, these advantages are permanently increased. We have only to be careful not to isolate any portion of the skin, so as to diminish its supply of blood, and thus cause ulcerations, sloughing, and blemishes. When the cellular tissue is entered, in deep firing, the cells become obliterated, and a bracing effect results. That this is the case, we have only to refer to the distressing and frightful contractions which often follow scalds and burns in the human subject; or, it is rendered still more evident, when dropsical effusions take place into the cellular membrane of the legs of a patient who

has previously suffered from ulcers in the same situation. Wherever the irritation of the ulcerative process has extended itself, there will the cells be entirely sealed up, and no effusion can take place at that part.

Firing is employed instead of caustic applications in many surgical instances. In open knee-joint it is used to arrest the flow of synovia, and in farcy the buds or ulcers are most beneficially seared with the budding-iron. The actual cautery is also of eminent service in arresting hæmorrhages.

## FISTULOUS WITHERS.

This arises from an inflammation of the fibro-ligamentous structures covering the points of the dorsal vertebræ, brought on by unequal or continued pressure. When injury has been given to this part, and heat, tenderness, and swelling are evinced, attempts should be made to reduce it at once by fomentations, cooling applications, evaporating lotions, &c.; but if these measures prove unsuccessful, and an abscess form, the matter should be early let out, by making a puncture with an abscess-lancet. A pledget of tow, smeared with digestive ointment, may be placed in the cavity, allowing a small portion of the hemp to protrude at the lips of the opening, to prevent their too speedy union. This pledget should be frequently changed, in order to absorb the matter as soon as formed; for if it be allowed to collect, it will, by its gravity, burrow down between the muscles, and form extensive sinuses. When the case has been so neglected that this has already taken place, the shortest and least painful method of cure is, to pass a seton from the bottom of the sinus towards the shoulder,

so as to ensure a drain or dependent outlet for the matter.

### FOMENTATIONS.

Fomentations are liquid washes, generally warm, consisting either of simple water, or water medicated. They are usually applied to the affected part by means of flannels soaked in the fluid, and partially wrung out. They lessen the pain and swelling of inflamed parts by opening the pores of the skin and exciting the capillaries to activity. Warm water will answer all these purposes, but frequently it is preferred to render the liquid more emollient by adding a decoction of marsh-mallows, or anodyne by the addition of an infusion of poppy capsules. The heat of a fomentation should seldom exceed 100° Fahrenheit. Hot verjuice or vinegar is by some considered a good foment for the fetlocks and back-sinews when tumefied. For the like purpose some stable-men place great reliance in a fomentation made by boiling common salt in milk until half the milk is evaporated. The affected parts are bathed with this fluid for a considerable time, and then the remainder is thickened with bran, and applied as a poultice. The camphor foment is made by mixing half an ounce of camphor, two ounces of acetic acid, and ten ounces of common vinegar.

### FOUNDER.

This is an inflammatory attack on the sensible laminæ, or plates uniting the coffin-bone to the wall of the hoof, and the other vascular portions of the foot. It is an acute and painful disease, and is frequently caused by over-driving on hard roads; long

standing on board ship; reaction, produced by covering the feet with litter after long exposure to wet and cold; metastatic transference of inflammation from other parts of the body; and by sympathy from overdistention of the stomach, or by a sudden change of corn diet, — as from oats to wheat, rye, or barley. Stallions are more liable to this disease than geldings and mares, probably from the greater weight of the fore-hand. Founder generally attacks both fore-feet, but occasionally only one of them suffers; sometimes, however, all four feet are simultaneously inflamed. When first attacked, the horse evinces pain by continually shifting his position, and, should the fore-feet be the seat of the disease, he places the hind ones forwards, underneath the body, so as to relieve those before of part of the pressure. As the complaint advances, the pulse gets up, the breathing increases in frequency, the animal lies down, mostly stretching out his legs at full length, occasionally regarding the pained parts with an expressive interest, and flinching on the application of the slightest touch to them. The feet are hot, and the arteries of the fetlock throb with increased violence. If the inflammation be allowed to take its own course, it frequently terminates by a sloughing, separation, or exfoliation of a portion, or the whole of the hoof. The most active antiphlogistic remedies are called for. The horn of the sole and crust should be thinned by the knife and rasp; blood should be abstracted from the toe (*vide* BLEEDING), and from the jugular vein, which may be repeated if the inflammation continue. Hot and cold fomentations, evaporating lotions, followed by moist poultices, enveloping the whole of the foot, may be applied. Pounded ice, placed in cloths, and wrapped about the feet, is often attended with good results; but some care is requisite in gradually discontinuing the use of this substance, in order to prevent reaction.

It is the practice of some veterinarians to apply blisters to the pastern and coronet in the early stages of this complaint; a custom which I have never seen attended with beneficial results, and think more inclined to increase than diminish the excited action in the immediate neighbourhood. Attention should be paid to the general health; laxatives and nauseating medicines may be given, with a low diet of green food, bran, mashes, and the like.

### GENTIAN.

The root of the *Gentiana lutea* is a serviceable vegetable bitter stomachic. Combined with other medicinal agents it is found extremely beneficial in anasarcal swellings of the extremities, farcy, glanders, low fevers, impairment of the digestive organs producing washiness. It is useful to promote restoration after attacks of disease, and indeed in all cases of general debility, in which tonics are indicated. It is usually given in conjunction with chyryata, quassia, camomile, cinchona bark, ginger, the mineral tonics, and Spanish fly. When the gentian root is given alone, the dose is about three drachms in fine powder, made into a ball with honey or treacle. It combines well with the salts of iron, not producing decomposition, as many other vegetable astringents do. Gentian root is a good antiseptic, and on this account a tincture or infusion is useful in destroying the fœtidness of fistulous and other ulcerations.

### GINGER.

Ginger is a cordial, stimulant, and carminative. Ginger is also a good adjunct with the cold saline

purgatives; it also prevents the griping effect that sometimes accompanies the administration of aloetic purges improperly prepared. Mr. Morton advises its combination with cathartics on the ground that it rouses the vitality of the intestinal surface generally, and renders it more susceptible of their influence. The dose of this root as a cordial is from two to four drachms, but when given as a stimulant in flatulent colic, more than double the quantity may be administered.

## GLANDERS.

The nature, cause, prevention, and treatment of this bane of horse-flesh have of late years become much better understood than they were formerly. The improvements in modern stabling of cavalry horses have almost completely stopped the ravages once so rife amongst them. Glanders and farcy are essentially modifications of one genus of disease, the chief cause of both being constitutional debility, induced by improper habitation. Glanders is only infectious, or even contagious, in circumstances where the recipient has been subjected to equally bad treatment, so as to predispose him to the reception and propagation of the poison. In deciding on the infectious or non-infectious nature of the disease, we should not overlook the fact that when it breaks out in a stable, the same causes that have originated it in one instance are operating with equal force on the other tenants; and instead of subsequent cases being the product of infection, they are merely the offspring of the working of the same agents. Like causes produce like effects. M. Galy, a French veterinarian, is a great partisan of non-infection. In 1837 he proposed to the Minister of War the institution of certain experiments,

in order to set the question at rest. His offer was accepted. Horses labouring under glanders were mixed with others perfectly sound. The experiment was so successful that no other horses were attacked, from the absence of a cause sufficiently potent to its production; and on the proposition of M. de Champagne, Inspector-General of the studs, it became a question to reconsider the ordinance of the 16th of July, 1784, which required the destruction of all glandered horses. Sometimes, when glanders shows itself in constitutions favourable to its reception, it runs a speedy and fatal course, attacking in succession the deep-seated lymphatic glands, the mesenteric glands, and the organs of respiration — this constitutes the acute form of glanders. Chronic glanders is less virulent and rapid in its progress. It usually shows itself by a discharge from the left nostril in the first instance.

*Causes.* — Among the most active causes of glanders are collecting together a great number of horses in a small or ill-ventilated stable, so as to compel them to breathe an atmosphere poisoned with exhalations from the skin, lungs, dung and urine of their companions. If the crowding be excessive, the causes soon operate. The closing of the hatches on board the transports in the Quiberon expedition during a storm glandered nearly all the horses. In 1843 Mehemet Ali freighted three ships with horses from the shores of the Black Sea. They were perfectly healthy on being shipped, but the great majority were glandered by their close confinement before they arrived at Alexandria. Low feeding, combined with imperfect aëration, is a frequent cause of glanders. Structural mal-formation of the chest, by lowering the vital resistance, predisposes to the reception of this complaint. Young horses are more liable to glanders than the adult. In this country it is most common in the winter season, from

the lowering effect of cold and the prevalence of close stabling, while in hotter climates it rages with the greatest force in the summer.

*Symptoms.*—Glanders is generally ushered in by some slight febrile disturbance; a portion of the usual supply of corn or other food remains unconsumed; the horse looks heavy about the eyes, and the lips are more pendulous than common; quickly, a glairy, viscid discharge flows from one or both nostrils. The membrane covering the septum of the nose loses its natural colour, and assumes a pallid hue, the vivid arterial crimson of the capillaries being changed to a bluish leaden colour. Ulceration of this tissue is also frequently present—invariably so in the latter stages, but not necessarily at the commencement of the disease. The intermaxillary glands tumefy from the absorption of the virus, and are tender when pressed. In acute glanders the discharge soon becomes more copious and offensive, the lungs are attacked with tubercle, and the animal rapidly declines; but in the chronic form of glanders, the nasal discharge may remain unaltered, and the horse support his appearance for many months, and occasionally for years.

*Treatment.*—This disease is not now considered so hopeless as it was formerly. Numerous cases of successful treatment show that it can be subdued by therapeutic agents. The great drawback to the establishment of a judicious system of combating this affection has been an unscientific and unwarrantable recourse to violent medicinal preparations. All the most active poisons have been employed again and again without success. In pursuance of this blind, empirical plan, Mr. Coleman gave, in the vain hope of finding a specific, "the various preparations of arsenic, antimony, copper, zinc, mercury, &c., hellebore, aconitum, digitalis, hyoscyamus, cicuta, belladonna, &c. &c., but all without any specific or

curative effect;" while some of these substances given in moderate doses have since been discovered to possess considerable curative influence over the disease. The affection being supposed to be generated by, as well as to generate, an animal virus or poison, powerful medical poisons were introduced into the system to combat it. A more correct pathological knowledge of glanders has led, and will lead to a more rational method of treating it. If the complaint spring from such causes as have been enumerated, no plan of treatment can be successful unless based on a removal of them. Debility being both a cause and a result of the disease, our aim should be directed to rouse, support, and strengthen the powers of the constitution. Accordingly, such remedies as have a stomachic and tonic action have been found most beneficial. Mr. Sewell has cured many cases of confirmed glanders by administering a solution of sulphate of copper in moderate doses. Mr. Vines prefers cantharides, bark, capsicum, cubebs, ginger, gentian, quassia, and such agents as improve the health and condition, by increasing the appetite, and through it the powers of the circulation. By adopting such principles, I cured more than fifty cases of glanders in the stables of the Egyptian Transit Company. The salts of iron, such as the sulphate, carbonate, and ioduret, are of essential service in glanders. Considerable benefit often arises from the continued use of the sulphuret of antimony combined with tonics. Chyryata, as a vegetable bitter and stomachic, is a powerful adjunct to mineral preparations, or to cantharides. When cantharides are employed, not more than three, four, or five grains should be given daily, as there will be less danger of over-dosing; for as soon as the animal is observed to refuse a portion of his usual rations, all that is necessary is to desist from the medicine for a day or two. Since nearly all the medicines possessing a curative

effect on glanders act by restoring the health by the improvement of the digestive powers, strict attention must be paid to the diet. The food should be of the best and most nutritious character, given without restriction, the quantity being alone governed by the extent of the animal's appetite:—speared corn, malt, sound oats, beans, and clover-hay, with an occasional recourse to green food or carrots. The horse should not be put to work, but daily exercise in the open air should be taken.

GLYSTERS. *Vide* CLYSTERS.

GREASE

Is a low inflammation of the sebaceous glands of the skin of the heels and fetlocks. Under this disease the glands enlarge and discharge a thin offensive humour. Cracks or ulcerations of the flexing portions of the skin are also frequent concomitants of grease. In bad cases the follicles of the skin assume a fungus or grape-like appearance. Grease is a disease that attacks horses of weak constitutional powers, and appears most commonly in the hind legs, they being farthest removed from the centre of circulation. Chestnut horses with white legs, are said to be more subject to grease than any other colour. It frequently appears in heavy cart-horses of lax fibre and with thick fleshy legs.

*Causes.* — Bad stable management is a common cause of grease. Wet legs, damp stables, deficient exercise, under or over feeding, injuries to the heels, want of cleanliness, and great acclivity of the stall, by putting the parts on the stretch. Grease occurs frequently from an inflammatory re-action set up after the legs have been exposed to wet or snow, increased by the litter preventing a free radiation of the heat generated. Grease is sometimes a constitu-

tional disease, established by nature to counteract some functional disturbance of the internal structure: in such cases it is injudicious to check it too suddenly by the employment of remedial agents.

*Treatment.* — In the simplest forms, grease is best combated by the internal administration of diuretics and alteratives, with bran, linseed-meal, carrot, yeast, or alum poultices applied locally. Saturnine lotions, and weak solutions of sulphate of copper, are also useful. Ointments are not often employed in the treatment of this affection; but the following, from the French of Vatel, is occasionally useful: —

*Grease Ointment.*

| | |
|---|---|
| Cupri sub-acetatis - - | 1 part. |
| Lard - - - - | 4 parts. |
| Honey - - - - | q. s. |

To make an ointment.

It can be diminished in activity by increasing the proportion of honey. Before application, it is well to wash the affected part with soft soap and water.

When there is a disposition to the grapy enlargements, the quickest as well as the most humane practice is to remove them by the actual cautery. This prevents loss of blood, and excites a restorative and healthy inflammation in the surrounding parts. Attention should be paid to the diet, by mashes, carrots, and other alterative food; and nourishing farinaceous substances should be supplied where the debility of the animal calls for it.

GRIPES. *Vide* COLIC.

GRUEL.

There are as many ways of making gruel for sick horses as there are for the human patient. It may

be made by simply stirring some oatmeal into warm water, but it is far more digestible when boiled. It takes about a pint of meal to make a gallon of good gruel, and it should be made by mixing the meal with the water—cold, then placing it on the fire, continue to stir until it has boiled for a short space, when it is to be set aside to cool. When gruel is used as a dilutent it ought to be made thin, but if given as a restorative to debilitated or convalescent horses, it should be made thick, and may even be rendered more tempting by being sweetened with sugar, honey, or treacle. Wheat flour makes a more nutritious gruel than oatmeal. Particular care as to cleanliness should be taken in making gruel; for if compounded in dirty vessels, or smoked over the fire, the horse will not take it voluntarily.

*White-water* is made by stirring a handful or two of flour or oatmeal into a bucket of water: it forms a good diluting drink.

*Bran-tea* and *hay-tea* are made by pouring boiling water upon bran or hay, and covering up the vessel until cool. They also furnish a grateful and nutritious liquid.

## GUMS.

Gums, such as *gum arabic* and *gum tragacanth*, are sometimes employed as demulcents. Solutions of gum are conveniently given in drenches of sulphate of copper, to shield the stomach from its corrosive action. Gums are also occasionally used in the pharmacy to facilitate the mixture of oil and water.

## HELLEBORE (BLACK).

The acrid roots of the *Helleborus niger* or black hellebore, has been introduced into the veterinary pharmacopœia as a local stimulant in fistulous ulcerations of the poll and withers. By sinking a fibre of the root into each sinus, and allowing it to remain until the discharge shows an improved action, much good has been accomplished. For this discovery we are indebted to Mr. E. Stanley of Banbury. I have occasionally found it equally serviceable when introduced in the same way into the pipes of a quittor; it appears, by a combination of its peculiar stimulating properties with that of the pressure of a foreign body, to bring about a new and healthy action in the callous tissues of the sinuses.

## HELLEBORE (WHITE).

*The Veratrum Album.* — Though all parts of this plant are extremely active and poisonous, yet the root only is selected as the officinal portion. It was introduced into horse medicine by Mr. Percivall as a nauseant. It is given in doses of from twenty to thirty grains, at intervals of four or six hours, until its depressing action is apparent. In unskilful hands it is a dangerous medicine, for if its action be carried too far it has often proved fatal. It undoubtedly is powerfully sedative on the system, but it is not more speedily or certainly so than digitalis, and assuredly cannot be considered as safe. As an external applicant, white hellebore is of great utility in the cuticular disease, mange. For this purpose it may be made into an ointment, or otherwise, combined with an infusion of tobacco, and with lime-water. — (*Vide* MANGE.)

## HERNIA.

Hernia, or protrusion of the intestines from their proper cavity, is not a very frequent lesion among horses. Occasionally foals are dropped with congenital hernia. Hernia ventralis, or hernia of the forward part of the abdomen, sometimes occurs from sudden exertion. It is often seen among the horses of the Easterns, whose pride it is, when riding, to check the animal in his speedy career, and bring him to a sudden halt. Inguinal and scrotal hernia occur among stallions, but the latter may occasionally exist to a limited extent without any apparent inconvenience; indeed I have more than once found it present in stallions after death from other causes, in whom its existence was never dreamt of.

## INFLUENZA.

This is a sub-acute inflammation of the mucous membranes of the body, disordering by sympathy the whole system. Influenza generally assumes an epizootic type, spreading over extensive tracts, raging, disappearing, then breaking out again, neither confining itself to country or town, or any particular district or locality. The exciting cause of influenza is almost universally supposed to be some aërial poison or infectious miasm, generated by natural causes, and spread by the winds. This poison being received into the system by the lungs contaminates the blood and all the secretions from it. The following description of the symptoms was written some time ago by one well known to the author. "The character of the disease varies according to the season of the year, as well as the state and condition of the animal at the

time of the attack; and although it exhibits characters in common, yet the epidemic of one year will be marked with some symptoms common to most of those it attacks, which will not appear with the epidemic of the next. In the autumn and winter months, the pulse is quick and weak, indicating the debilitated state of the animal. In the spring and summer months, the disease assumes a more active character. In some, it bears a resemblance to common fever; in others, it is marked from the beginning by severe constitutional disturbance. In one, the eyes are most affected; in a second, the lungs; in a third, the respiratory passages; in a fourth, the brain is attacked; in a fifth, the digestive mucous surfaces, diarrhœa supervening, and the animal sinks under its operation. The principal features of the disease, at its commencement, are a dead and unhealthy appearance of the coat, head and ears cold, with drooping, dejected countenance, mouth warm, dry, and feverish, the lips swelled; considerable tumefaction of the eyelids, and sometimes enlargement of the parotid, and one or both of the lymphatic glands; eyes nearly closed, and flowing with tears; redness of the nasal and conjunctival membranes, usually accompanied with a yellow discharge (though in some cases it has a green hue), which appears like a mixture of lymph, pus, and mucus; total loss of appetite; sore throat is generally present, and sometimes considerable cough, and a most common accompaniment is swelled legs: but in all cases there is great and rapid supervention of debility; this alone is a pathognomic symptom characteristic of the disease, and of the fever that accompanies it; the flanks tucked up; great disinclination to move or turn in his stall; an apparent stiffness of the whole muscular system, attended with a remarkable degree of tenderness upon the least touch: when moved, he staggers and reels about: the dung and urine are

voided in small quantities, and with apparent difficulty; the pulse is accelerated to about sixty, small and weak; the respiration is not usually at first affected, but if relief be not obtained at the onset, the inflammation extends to the bronchial passages, and rapidly assumes every symptom of pneumonia, of an intense character."

*Treatment.*—In this disease our usual derivative resources must be used with care and discrimination. Bleeding, and other depletive measures, must be directed by the state of the pulse, the condition and age of the animal, and the extent and continuance of the disease. Early in the attack, moderate bleeding, to the amount of four or five quarts taken from a large orifice, will be generally beneficial. If the horse be debilitated, staggers in his walk, and has a pulse both quick and small, then no blood must be abstracted. Aperient medicines of a mild character may be given, with laxative clysters, but care must be taken not to over-excite the intestines by purgatives. A formula combining a febrifuge, with mild aperient and diuretic medicines which I have found of great value, is subjoined.

| | |
|---|---|
| Carbonate of ammonia | - 1 drachm. |
| Aloes - - | - 1 drachm. |
| Nitrate of potass - | - 1 drachm. |

Made into a ball with palm oil and flour.

If spontaneous purging set in, active astringents should be promptly administered. The exhalents of the skin should be called into action by warm clothing, bandages to the legs, hand-rubbing, &c. The box should be sufficiently ventilated. A vapour bath to the head, made by half filling a nose-bag with bran or saw dust, and scalding it with water. This is tied on over the nose, and promotes secretion from the nose, sinuses of the head, and the air passages. It must not, however, be kept on so long as to distress

the animal, and is more applicable when the disease has continued for some days. At the same time, blisters may be applied to the neck, chest, and throat. As long as febrile symptoms show themselves, the diet must be low — green meat, mashes, and gruel; but as soon as the more active demonstrations of the disease are subdued, assiduous care should be taken to promote the restorative process by a more generous and coaxing diet; for this purpose, malt mashes, speared corn, boiled linseed, carrots, and an alternation of the artificial grasses may be employed, with the occasional exhibition of a mild stomachic: as the appetite returns, the horse may be put upon his usual food.

## IODINE.

Iodine or its compounds have not hitherto been much employed in horse medicine. The inward administration of iodine, with external use of the simple iodine ointment, has been successfully tried in the reduction of indurated glands, remaining after bastard strangles, influenza, and catarrh. I have seen the iodine of potassium ointment tried for the resolution of large splints, and with very flattering results; but extreme care is necessary, as it sometimes produces an extensive ulceration of the integument. In 1836, at the suggestion of Mr. Morton, I tried the curative effect of ioduret of iron in a case of glanders with complete success. The commencing dose was ten grains bi-daily, combined with gentian. This was gradually increased until each dose amounted to twenty grains; at the same time the nostrils were syringed with a dilute solution of the chloride of lime, and the most nutritious diet supplied. In less than a month all symptoms of the disease had disappeared, and the horse was greatly improved in condition.

## IRON (FERRUM).

Some of the preparations of this metal may be beneficially employed in horse medicine. Of all the metallic compounds they are the most simple in their effects. Their action is more or less of a tonic character, giving additional colour to the blood and muscular tissues, and increasing the force and fulness of the circulation. *The subcarbonate of iron (ferri subcarbonas)* is not very powerful, and requires to be continued for some length of time before its effects are evident. The dose is from four to eight drachms. *Sulphate of iron (ferri sulphas)* is more active, and has been used with success in some forms of glanders. Dose — four drachms. It is a tonic and astringent. The alkalies, soap and astringent vegetable infusions, decompose it, therefore it cannot be given in combination with any of them.

## JAUNDICE.

An uncommon affection in the horse. The reason of which is evident, for as it generally arises from some obstruction in the vessels collecting or conveying the bile from the liver to the duodenum, and as this passage in our patient is simple and short, without the usual reservoir, the gall-bladder, such stoppages are so much the less likely to occur. Yet occasionally obstructions do take place even in the uncomplex gall-duct of the horse, and the bile is then rapidly absorbed and carried into the system, tinging the skin and mucous membranes of the eye and mouth yellow — "the yellows" of the farriers. In this form of the complaint, it will be generally noticed, that the bowels from losing their natural stimulant

become costive, and the appetite is impaired or lost. Therefore the remedies employed are such as will restore the natural secretion of bile, and excite the peristaltic motion of the intestines, such as calomel and aloes in small and repeated doses. Another form of jaundice attends internal disease as a symptomatic companion. Occasionally it arises from a morbid flow of bile.

## KUMREE.

This is a disease attacking horses in India during the periodical rains. It exhibits itself as a paralysis of the hinder limbs, produced by dropsy of the *theca vertebralis*, or sheath of the spinal marrow. The natural deposition of fluid is allowed to exceed its healthy proportion by a diminution of the activity of the absorbents, or an increase of that of the exhalents. Horses with kumree go pretty fairly on level ground, though they always show a weakness about the loins; but on ascending or descending a hill the fluid gravitates to one part of the theca, and by pressing on the *medulla spinalis* gives rise to paralysis of the motor nerves situated below the point of pressure. Mr. Moorcroft opened the frontal sinus, and evacuated the fluid by elevating the posterior extremities of the animal, but death ensued on the tenth day from symptomatic fever. The most reasonable plan of treatment appears to be the administration of such medicines as increase the action of the absorbents without debilitating the animal. With this view moderate doses of cantharides, repeated daily, might by combining tonic with diuretic properties be attended with benefit. Blistering along the course of the spine might assist the attainment of the same end.

## LAMPAS.

This term is applied to a slight intumescence of the gums and rugæ or bars of the palate, existing in sympathetic connection with some derangement of the stomach, liver, or intestines, though not materially affecting the health. Accordingly, applications to the roof of the mouth, such as burning, scarifications, and medical stimulants, although they may occasionally temporarily relieve the tenderness of the part, will not remove the tendency to the re-appearance of lampas. The cause, whether it be worms in the *primæ viæ*, bad food, or improper treatment, must be ascertained and removed, and lampas, the effect, will readily subside of itself.

## LAXATIVES.

Laxatives are agents that act as mild purgatives. Diminished doses of cathartics, as of aloes and calomel, will frequently operate as laxatives. Linseed oil in half-pint doses is a safe and expeditious laxative. Bran is a mechanical laxative. Nature provides periodical laxatives. Grass, twice a year — spring and fall — is endowed with relaxing properties; and that of the salt marshes is so all the year round.

## LEAD (PLUMBUM).

Three of the combinations of this metal are admitted as veterinary officinal preparations: — viz. The carbonate, the acetate, and the liquor plumbi diacetatis. *The plumbi carbonas*, or carbonate of lead, is used, when powdered, to sprinkle on wounds

and ulcers to dry them up. *The plumbi acetas.* Taken internally, the acetate of lead is a powerful astringent and sedative, but it is seldom prescribed in horse medicine. Externally, when dissolved in a large portion of water, with a little distilled vinegar to prevent decomposition, it constitutes an excellent collyrium in ophthalmia. A drachm to a pint of water makes a powerful local application to farcy buds and ulcers, and to some other forms of cuticular disease. *Liquor plumbi diacetatis*, or Goulard's extract, is of nearly similar properties to the preceding compound. It acts as a sedative on the skin, and in external inflammations of the eye. Mr. Morton, in his Manual of Veterinary Pharmacy, recommends "a valuable liniment for excoriated surfaces, or after the application of a blister, made by triturating together one part of the solution of the diacetate of lead and four parts of olive oil." The formulary for the composition of the *liquor plumbi diacetatis dilutus* kept for general use is

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|---|---|
| Solution of acetate of lead | - one drachm. |
| Distilled water - - | - one pint. |
| Proof spirit - - | - one drachm. |

## LIME (CALX).

Lime is generally prepared from its natural carbonates, by exposing them to a strong red heat. It is but slightly soluble in water at any temperature, but more so in cold than in hot water. According to Mr. Phillips's experiments 10,000 grains of water at 60° dissolve only 9·7 grains of lime. In this state of solution it is used in veterinary medicine, under the appellation of *liquor calcis*, or lime water.

*Liquor Calcis.* — To half a pound of lime pour twelve pints of water; cover the vessel directly, and set apart for three hours, when the clear fluid is to be poured off, and kept in well-stoppered bottles for use. Lime water exhibited internally is found serviceable in diabetes or profuse staling, and it is also a good vermifuge.* Externally, it is a useful detergent in mange, surfeit, mallenders, and foul ulcers.

*Carbonas Calcis Præparatus.* — Prepared chalk. Chalk is an antacid and astringent. It checks diarrhœa when combined with opium, catechu, or starch. The dose is about an ounce, but no harm will result in such cases if a much larger quantity be administered.

*Calx Chlorinata.* — Chloride of lime. This is a combination of chlorine and lime in so weak a manner that the chlorine is set free when exposed to the air, and the lime left in the form of a carbonate. On this peculiarity depends its valuable disinfecting properties; the freed chlorine decomposes any deleterious or fetid gases that may be floating in the atmosphere. Solutions of chloride of lime, in the proportion of a pound

* On one occasion I was called to attend a case of poisoning from this agent. The animal, a fine cart-stallion, was supposed to have worms, and a neighbouring farrier being consulted, it was resolved, after fasting the animal all day, to administer a solution of lime: to render the attainment of the desired object certain, he most injudiciously stirred up the slaked lime from the bottom of the bucket in which the solution was made, and in this manner gave an unknown quantity of the caustic earth. Its effects soon became alarmingly apparent; the lips were blistered, excoriated, and swollen, the buccal membrane spotted with red patches, long ropes of slime depended from the mouth; the eyes were most sensitively affected, the lids hanging half closed, tumefied, and discharging tears; the urine when passed was high coloured, and the fæces hard, dry, and covered with a deep-brown crust, indicative of internal heat. Pulse seventy, and full. There was an unwillingness to move, and a total loss of appetite.—Treatment. V. S. to eight quarts: as an acid was chemically indicated, I administered a quart of common vinegar, diluted, as being the soonest procurable. The change from this time was magically beneficial: in less than three hours afterwards he was able to pick a little bran mash, and had evidently overcome the pernicious effects of the poison. Subsequently he was drenched with ten ounces of linseed-oil and a quantity of gruel. In a few days he was able to return to his work, although the prostration in the first instance had been alarming. I give this case as a caution to prevent a recurrence of similar accidents by the employment of ignorant empirics.

to a gallon of water, is a valuable applicant in foul phagedenic ulcers or wounds, and in grease and mange. Mr. Youatt recommends its internal use in flatulent distension of the stomach, in doses of a pint to a quart.

### LINSEED.

Infusion of linseed, or *linseed-tea*, is given as a demulcent in coughs, catarrhs, and sore throats. *Linseed-meal* makes a good emollient poultice, and forms a proper vehicle for giving bulk to balls. *Linseed-oil* is one of the safest cathartics known. In doses of from a pint to a quart it acts with a certitude and gentleness unknown to any other cathartic. As a vermifuge it is highly valued.

### LOTIONS: *vide* EMBROCATIONS.

### MALLENDERS AND SALLENDERS.

These terms, borrowed from the old menage, are applied to scurfy eruptions of the skin — the former at the back or bending part of the knee, and the latter in the most forward, flexing, portion of the hock. They arise from insufficient grooming; the sebaceous glands of the parts being excited by the accumulated dirt and the dried salts of the perspiration, to a diseased secretion, accompanied with scaly exfoliations of the cuticle. Washing with soap and water, together with the subsequent application of astringent lotions, soon remedy these trifling departures from the healthy state.

### MANGE.

An eruptive itching, and contagious affection of the skin, said to arise from the presence of the acarus, or

itch insect. Mange usually first shows itself about the mane and tail; the roots and bulbs of the long hairs of which eventually become diseased, and on pulling some of them out, pus is found adhering to them. It soon spreads itself to other parts of the body, divesting the skin of patches of hair about the neck, shoulders, croup, and loins. When arising spontaneously, it appears, in the majority of instances, in such as are emaciated; and these also take it more readily by contact, while sound-constitutioned horses, even when exposed to contagion, resist and overcome its attacks. Mange is generally regarded as a local disease; but as its causation is so materially aided by debility, we should not overlook constitutional remedies when endeavouring to cure it. With this view, errors in diet should be rectified; generous food should be liberally supplied: the changes may be rung on carrots, vetches, and speared corn, so as to produce an alterative effect on the system. Tonics may also be given with advantage, combined with sulphur, antimony, or even the mercurials. Before the use of external applications, the skin should be well washed with soft soap and water, and an occasional repetition of the practice will be of service. Mr. Blaine recommends a wash composed of—

"White hellebore - - - - two ounces.
Tobacco - - - - - two ounces.
Lime-water, strong and fresh made one pint.
Water - - - - - three pints.

Boil the hellebore and tobacco in the three pints of water to a quart; when cold, add the lime-water. Put the whole into a bottle, and cork it well, pouring it out as wanted." I have frequently used this formula, and found it highly efficacious, but think the addition of a couple of ounces of sulphur increases its curative virtues.

Diluted creosote and oil of tar have been success-

fully appplied as a remedy for mange, but the chief objection is their offensive odour. Equal parts of Stockholm tar, cocoa-nut oil, and bees' wax, melted together, and rubbed into the skin with a stiff brush, will often remove this complaint when other means fail.

### MASHES.

Mashes constitute the chief part of the provender of a sick or convalescent horse, and they are also given as prophylactic means of preserving the animal's health. Mashes are most commonly made of sweet bran, by pouring boiling water on it, in a bucket, so that they may be, when well mixed, soft, or about the consistence of a poultice. There are but few horses who will not eat a bran mash, and these may be induced to do so by mixing a little corn with it, so as to make it more palatable to them. Bran mashes are of themselves slightly laxative, and for this reason should be repeatedly had recourse to when horses stand too long in the stable and become costive. A mash given on Saturday night obviates any ill effects of standing still on Sunday; and for heavy draught horses the practice of allowing one at that time will tend much to keep those that are high-fed in health. Bran mashes are also given preparative to more active cathartic medicine, as, by their preliminary laxative effect, they remove hard food from the intestines, and promote an easier purgative action. On this account it is generally the custom to allow horses bran mashes the day previous to their being put under the operation of cathartics, and to continue their use until the purging ceases, or in stable language, till the physic has set. Steaming bran mashes, placed in a nose-bag, are adverted to, to clear the head in catarrhal affections. *Malt mashes* are most

important restoratives to diseased and debilitated horses. They are both nutritive and tempting, and many a horse's life has been saved by recourse to this food. Malt should not be scalded to make a mash; for if the temperature of the water be too high, the malt will clog together, and be less relished by the patient. Another form of mash, though it can scarcely be included in that category, is partially germinated or *speared corn*. By moistening corn in a heap for twenty-four hours, and then spreading it out to the air until the germinating process is set up, a change takes place in its proximate constituents, and sugar is the immediate product. Hence it affords nutriment with less difficulty of assimilation, and in weakened constitutions this property is of value. Where corn is employed in this manner, it must not be sprouted in too large quantities, but made from day to day, as consumed, for it is apt, when kept too long, to grow sour and mouldy.

## MERCURY (HYDRARGYRUM).

The mercurial preparations admitted into the equine pharmacopœia are mercurial ointment, the ointment of the nitrate of mercury, calomel, corrosive sublimate, and Æthiops-mineral.

*Unguentum Hydrargyri Fortius.*—Strong mercurial ointment. "Take of purified lard twenty-three ounces, prepared suet an ounce. First rub the mercury with the suet and a little of the lard until the globules disappear; then add the remainder of the fat, and mix." The milder mercurial ointment is made by diluting the above with twice its weight of lard. The strong mercurial ointment is rubbed on the skin covering ossific deposits and callous tumefactions of the extremities, to promote absorption. It is also endermically applied with benefit in some

forms of hepatic disease: when introduced in this manner, it is found to act more powerfully on the system without deranging the bowels. The milder ointment is used in scurfy eruptions of the skin, as mallenders, and it has also been occasionally employed in some of the modifications of mange.

*Unguentum Hydrargyri Nitratis*, or ointment of the nitrate of mercury.

| | |
|---|---|
| Purified mercury | - one ounce. |
| Nitric acid - | - eleven fluid ounces. |
| Prepared lard - | - six ounces. |
| Olive oil - | - four fluid ounces. |

Dissolve the mercury in the acid; then mix the solution, while it is hot, with the lard and oil melted together. This ointment is used as an outward stimulant and detergent in the varied forms of cutaneous eruptive diseases.

*Hydrargyri Chloridum.* — Proto-chloride of mercury, calomel. Notwithstanding the value of calomel in human medical practice, it is not much used by the veterinarian. As a purgative it can seldom be depended upon, and is considered unsafe. When given repeatedly it is apt to accumulate in the system and produce sudden ptyalism or salivation; consequently, it is necessary to follow its administration by laxatives or purgatives, a course not always convenient or even proper. At the Veterinary College it is much used as a vermifuge, being given in doses of from one to two drachms at night, followed in the morning by an aloetic purge. In torpidity of the liver, calomel is admissible and useful. Solution of calomel in lime-water (two drachms to the pint), "black-wash," is sometimes used to excite a healthy action in ulcers.

*Hydrargyri Bichloridum*, corrosive sublimate, has been prescribed as a tonic alterant, by some practitioners, in glanders and farcy, in daily doses of from

ten to twenty grains, but it always requires attentive watching. It is used extensively as an escharotic, and occasionally in mange, and for the destruction of lice. For the last purposes, an aqueous solution is made of a few grains to the ounce. This is also of service as a stimulating lotion in chronic grease.

*Hydrargyri Sulphuretum Nigrum.* — The black sulphuret of mercury, Æthiops-mineral. This preparation of mercury possesses considerable power as a tonic in farcy, glanders, and in cases of inveterate mange. Blaine recommends its more frequent use as an alterative and vermifuge. The dose is from two to three drachms, given in the horse's corn, once or twice a day, until the breath is offensively affected, or it acts perceptibly on the kidneys.

## MYRRH.

This is a gum-resin. It has been prescribed internally as a tonic, in doses of one or two drachms, but is now replaced by more efficient agents. Its principal use is as a traumatic in spirituous solution, alone or in combination with aloes.

### *Simple Tincture of Myrrh.*

| | |
|---|---|
| Myrrh - - | - four ounces. |
| Rectified spirits - | - three pints. |

Macerate for a fortnight, and filter for use.

### *Compound Tincture of Myrrh.*

| | |
|---|---|
| Simple tincture of myrrh | - two pints. |
| Aloes, powdered - | - three ounces. |

Macerate as before, and strain.

## NARCOTICS.

Narcotics are supposed to act primarily on the brain and nerves, and through them on the vascular system. They cause a depression of the vital power. Their first action is imagined to be exciting, but this is quickly followed by the sedative effect. The principal narcotics are opium, digitalis, hellebore, and tobacco.

## NEPHRITIS.

Nephritis, or inflammation of the kidneys, sometimes makes its appearance among horses. It is highly dangerous. It generally arises from eating mow-burnt hay or musted oats; from revulsion of the circulating fluids by exposure to cold, rain, and evaporation, particularly over the loins; over-exertion will also occasionally bring it on. The animal expresses great pain, standing with his hind legs wide apart, and repeatedly endeavouring to stale, but usually without effect, or only in small quantities, and that discoloured and bloody. The indications offered by the pulse tell of the progressive inflammation: in the commencement of the attack it is full and frequent, but eventually more rapid and oppressed. Pressure on the loins gives pain. *Treatment.* — Free and repeated bleedings, back-raking, clysters, and a mercurial or aloetic purge. Nothing possessing a diuretic action should be administered, as it would only increase the evil. For this reason, blistering applications, into whose composition the Spanish beetle, or even turpentine, enters, must be discarded. Sinapisms may be used instead. A sheep-skin, just stripped from the animal, and put over the loins with the woolly side outwards, will promote an active local diaphoresis. It is usually

recommended to keep the horse short of water during the continuance of nephritis, but I regard the practice as injudicious. Nauseating doses of aloes may be given every two or three hours.

## NEUROTOMY.

It was found that if the nerves of sensation were divided between the brain or medulla spinalis and the parts they supply, that no sentient perceptions from the parts below the section would be transmitted to the sensorium, until, in the progress of time, the divided ends of the nerve again united. If a short portion of the nerve were removed, the loss of sensation would be still further prolonged, until a reproduction of nervous tissue reunited the severed fibrils. Professor Sewell availed himself of these facts, and applied them to the treatment and cure of disease of the feet of the horse. To him the public are entirely indebted for the introduction of this valuable veterinary therapeutic agent. He states that he has performed it successfully in more than eleven hundred cases. If the nerves be divided above the fetlock-joint, all sensation in the foot will be destroyed; but as these nerves give off branches just above the joint, to supply the front portion of the foot and side cartilages, it will be evident, that if the section is made below the fetlock, that feeling in the foot will not be entirely removed. On this account the high operation is found most beneficial in cases of ring-bone, ossified cartilages, quittor, and sand-crack; and the low operation in joint capsular disease, contraction, and in tetanus, from punctures of the sole or navicular joint. Neurotomy is inapplicable in cases of inflamed laminæ, founder, and in flat or convex soled or pumiced feet. If the nerve be simply divided, though there be a retraction of the ends,

they it will unite again in less than two months. In quittor, sand-crack, or when only one of the cartilages is diseased, it is only necessary to divide the nerve on the affected side; but in all other cases it is best to divide the nerves on each side. When the unnerving effect is wished to be continued for some considerable time, a portion of the nerve is cut away, varying from half an inch to an inch in length. Possibly, part of the advantage accruing to cases of chronic inflammation of the feet arises from the circulation and the temperature being simultaneously diminished with the section of the nerve.

The operation is easily performed. The horse is cast, and the leg intended to be operated upon firmly secured. The pulsations of the artery direct the incision through the skin. The artery, vein, and nerve, accompany each other down the leg, the nerve lying most towards the back parts of the leg is known by its silvery reflection. The nerve is elevated by a tenaculum or by a bent needle, and cut asunder from beneath upwards. When a portion is to be excised, the upper incision should be made first, as, by so doing, the severe and painful paroxysm that accompanies its division will not be repeated. The small wounds made in the integuments may be drawn together by suture or compress, so as to bring about a union by the first intention, or they may be left entirely to nature's restorative powers.

### NITRE.

*The nitrate of potassa*, or nitre, is frequently used as a cooling diuretic. It is given in fevers, coughs, and catarrhs. Most frequently it is combined with an adjuvans or assisting agent, in accordance with the object in view. As a febrifuge, it may be combined with carbonate of ammonia, and with tartar emetic, or

other antimonials: in colds and coughs, it may be dissolved in linseed-tea, or any other demulcent drink. A moderate dose is about three drachms, but much larger quantities are frequently given by farriers. I have seen a horse poisoned with nitre, but could not ascertain the dose given. As a diuretic, it may be conveniently dissolved in the water given to the horse to drink. A solution is sometimes applied outwardly to gangrenous wounds.

## OPHTHALMIA.

Common ophthalmia, or inflammation of the conjunctiva, generally arises from mechanical injuries to the eye; occasionally it is an attendant on catarrh and other epidemic inflammatory complaints. It usually gives way to the remedies found most efficient in reducing local inflammations, such as topical bleedings, fomentations, astringent applications, blisters, &c. But another kind of ophthalmia attacks the eye of the horse, which is far less certain in its cause, course, and cure, termed *specific* or *periodical ophthalmia*. This affection is destructive to the functions of the eye, and is supposed to be both constitutional and hereditary. It does not appear to be much under the influence of surgical and medical treatment; attacks one eye, to disappear and be reproduced in the same or the opposite globe, thus alternating from eye to eye until one or both are destroyed. Specific ophthalmia is less a superficial disease than common ophthalmia. It does not confine itself to the outward covering of the eye, but invades, simultaneously, or in rapid succession, the other portions of the visual globe. The eye-lids are swollen, and partially closed to exclude the rays of light; the eye-ball is retracted into the orbit, and the haw, itself inflamed, is forced over the front part of the organ; there is a discharge of scald

ing tears; the pupil is contracted; the humours of the eye turbid; and the conjunctiva injected. At other times the disease is more mild at the commencement of the attack; there is only a simple opacity of the cornea, which intermits at irregular intervals without any primary derangement of the deep portions of the ball of the eye. The causes of this singular complaint are not well defined, but there can be no doubt that hereditary predisposition is a frequent source of it. Congestion of blood about the head, from pressure of the collar, disturbances of the digestive organs from bad food, and insufficient ventilation, may originate or increase the liability to this ophthalmia. Hurtrel d'Arbobal regards dentition as an occasional cause of this periodical disease, and I think with good reason, as it generally appears in young horses during the process of teething, and is increased by the mastication of hard and dry food. The treatment of specific ophthalmia does not essentially differ from that of common inflammations of the conjunctival membrane. Fomentations, collyriums, bleeding from the angular vein, scarifications of the vessels of the lids, setons passed near the eye, rowels under the throat, blisters, laxative medicine, and soft diet, are among the usual means adopted, sometimes with success, but too often without any attending benefit. Some practitioners have advocated the destruction of one eye in order to save the other; and from the long prevalence of the custom among farriers, together with the knowledge of the physiological fact, that the loss of one organ of sensation has a tendency to strengthen the other, and also granting something for the counter-irritation which must be set up, it is not unreasonable to suppose this line of practice may frequently be successful, though I have had no direct experience of its effects. The natives of Egypt, when attacked with

the epidemic ophthalmia of the country, commonly resort to this somewhat anomalous operation in order to preserve the sight of one eye.

## OPIUM.

This is a well-known powerful sedative and anti-spasmodic on the horse. Though enormous doses can be given in health without producing sleepiness, yet in diseases of nervous excitation small quantities act with decisive energy in allaying the irritation. Professor Coleman denied the power of opium on this quadruped. Possibly the reason why this agent does not produce somnolency in the horse is, that he is an animal that sleeps but little, and therefore is almost insensible to such an action, although it may operate otherwise as a sedative: consequently those who deny the influence of opium from such grounds, form their opinions on erroneous premises. In tetanus its effects are markedly efficacious. In doses of two or three drachms, in spasmodic colic, the benefit is sometimes striking. As an astringent, in diarrhœa or superpurgation, opiate clysters are employed to restrain the inordinate excretion and the accompanying tenesmus, with good effect. In enteritis, a dose of opium, preceded by blood-letting, often puts a period at once to the disease. For this purpose, a couple of drachms is given dissolved in warm water as a drench, and repeated at hourly intervals, if necessary. As an anti-spasmodic, a spirituous solution is generally preferred.

### *Tincture of Opium.*

Opium, powdered, two and a half ounces.
Proof spirit, two pints.
Macerate for fourteen days, and strain.

### PERITONITIS.

This is an inflammation of the peritoneal covering of the intestines, differing in its symptoms but little from enteritis, or inflammation of the intestines themselves. Peritonitis seldom arises spontaneously, but mostly from mechanical injuries, such as inflammation extending up the spermatic cord after castration, abdominal wounds, hernia, strangulation of the intestines, membranous strains, and injuries during leaping or galloping. In the course of the disease the other tissues of the intestines become involved in the inflammatory action, and its treatment is consequently similar to that of enteritis.

### PIMENTA.

The pimenta berry, or Jamaica allspice, was introduced into horse-medicine as a stimulating antispasmodic, by Mr. Bracy Clark. He advocated its employment in gripes, in the form of tincture, in doses of four ounces every hour, until relief was obtained.

*Tincture of Pimenta.*

Pimenta berries, bruised - - one pound.
Proof spirits - - - six pints.
Macerate for fourteen days, and filter.

### PNEUMONIA, OR PNEUMONITIS.

An inflammation of the substance of the lungs. Pneumonia is rapid and dangerous in its course and terminations, and is a disease to which horses in a state of domestication appear particularly predisposed. The causes are supposed to be plethora, from high feeding

and want of exercise; over-exertion when out of condition; revulsion of the circulating fluids, by hot clothing and close stabling, followed by exposure to cold, particularly in the spring and autumn during the shedding of the coat, and by alternations from cold to heat: occasionally it rages in almost an epizootic form when the spring continues wet and cold. Young horses are very liable to it. Mucous irritation of the trachea, the bronchia, or the air-cells, sometimes degenerates into active inflammation of the parenchyma of the lungs. Pneumonia is not frequently ushered in by any enduring premonitory symptoms, its attack being generally sudden. A shivering is noticed; the ears and legs become unnaturally cold; the animal is languid and dull; refuses his food; the breath is elevated in temperature; the mouth hot, clammy, and dry. As the disease takes confirmed hold, the breathing quickens, the flanks heave, the inspirations become somewhat longer than the expiration, which is short and painful. He stands with his fore-legs separated, in order that the muscles attaching the limbs to the chest may assist in expanding that cavity, by drawing the ribs outward. The pulse, at first variable and depressed, now becomes irregular, rapid, and scarcely perceptible. Patches of perspiration occur, but the sweating is rarely so copious as when the bowels are the subject of inflammatory action. Death ensues, often as early as the second day from the commencement of the attack; but commonly that event does not take place till about the sixth day, or even at a more extended period.

*Treatment.* — As the lungs are highly vascular, vital organs, it is evident that venesection must have considerable influence on them when suffering from an increased determination of blood or congestion. Copious bleedings from a large orifice, in the early stages

of the complaint, is the sheet-anchor in the treatment of pneumonia. If the finger be kept on the pulse, the relief is observed to be almost immediate. The obstructed and oppressed state of the circulation perceptibly decreases. The pulse, before wiry and irregular, becomes, by the abstraction of blood, more full, equal, and regular in its vibrations. Even after the first bleeding, should the respiration maintain an unnaturally exalted state, and the pulse continue bounding and strong, we must again recur to venesection. Endeavours should be made to equalise the circulation, by clothing, bandages to the legs, and by the admittance of a pure, cool atmosphere—a well-ventilated box being far preferable to a stall. Water should be placed at the disposal of the animal, and he should be kept free from interruptions and annoying disturbances. From the intimate sympathy which exists between the lungs and intestines, the administration of purgative medicine in pneumonia is often found to be followed by a transference of the inflammatory action to the bowels; therefore, if costiveness be present, endeavours must be made to relieve it by back-raking, enemas, and mashes. Nauseating, sedative, diaphoretic, and mild diuretic medicaments are most to be depended on in pneumonia. If laxatives be imperatively requisite, small doses (five or six ounces) of linseed oil will be found safer than aloes.

Blisters of cantharides may be applied to the chest and sides. As a valuable nauseant and sudorific, Mr. Percivall recommends the white hellebore root (*veratrum album radix*), prescribed as follows:—

| | |
|---|---|
| White hellebore - - | from a scruple to half a drachm. |
| Powdered camomile flowers | half an ounce. |
| Simple syrup - - | *q. s.* |

To be made into a ball, and administered every third or fourth hour.

When the high state of irritation is apparently subsiding, Mr. Blaine suggests the administration of the following compound, repeated in accordance to the urgency of the symptoms: —

| | |
|---|---|
| Antimonial powder - - | two drachms. |
| Digitalis (powdered fox-glove) - | two drachms. |
| Nitrated potass (nitre) - | three drachms. |
| Supertartrate of potass (cream of tartar) - - - | three drachms. |

I have always placed considerable reliance on the use of the sesquicarbonate of ammonia, when the first shock of inflammation is overcome: though it is in opposition to the spirit and theory of human medicine (*vide* AMMONIA, *sesquicarbonate*). In accordance with the doctrine of the schools, Mr Blaine urges, "that direct stimulants are admissible only in cases where the severity of the inflammatory symptoms has relaxed;" but experience has taught me that horses bear early stimulation much better than the human patient, and that the lower state of their vital resistance demands it. A ball formed of

| | |
|---|---|
| Sesquicarbonate of ammonia, coarsely powdered, from - | one to two drachms. |
| Nitrate of potass - - | two drachms. |
| Powdered resin - - | two drachms. |
| Aloes - - - | half a drachm. |

Made into a ball with palm-oil and ground linseed, and given every two, three, or four hours, until the state of the secretions is improved, and the demand for them less urgent.

Setons across the chest or behind the elbows are of paramount importance in assisting the counter-irritating action of the blisters already recommended.

While the disease continues but little attempt should be made to force food on the animal. Nature is the best guide. A few tares may be placed before him, of which he will occasionally pick a few stalks. A potion of linseed-tea or thin gruel may also be offered him, but drenching in the early stages should be avoided, as unnecessarily disturbing the patient. During the convalescence of the animal, nutritive drenches and food may be supplied, and he may be walked about in fine weather, the distance and continuance of the walks being regulated by his returning strength.

### POLL-EVIL

Is originally a deep-seated abscess near the junction of the head and neck, the matter of which, being prevented by the vertebral bones from opening downwards, makes its outlet at the poll, and appears there in the shape of an extensive, fistulous, spreading ulcer. Its situation is primarily beneath the yellow cervical ligament, or pax-wax, in the ligaments and condensed cellular tissue connecting the first bones of the neck to the occiput. Almost the sole cause of this painful affection is the use of the bearing-rein, which, by keeping the head in an unnatural position, throws an injurious stress on the ligaments when the animal exerts himself in drawing. Hence it is seen exclusively in horses employed in draught, particularly those of the heaviest description. Its treatment is very similar to that of fistulous withers. We must endeavour to obtain a depending opening to drain the matter formed and in the course of secretion, by passing a seton obliquely through the muscle and integuments. Our next object will be to stimulate the fistulous and callous lining of the ulcer to a more healthy action, by the application of escharotics, as the diluted mineral acids, solutions of the nitrate of silver, perchloride of mercury, &c., not forgetting that

an occasional recurrence to an opposite plan of treatment, the employment of saturnine and sedative lotions, will frequently be found beneficial. If such a course be adopted in the early stage of the disease, no recourse will be required to be had to the abhorrent method of scalding, so common among farriers in their endeavours to cure poll-evil.

POTASS, *vide* NITRE.

## POULTICES.

Poultices are generally made of bran or linseed meal. They are often of the utmost service in abating inflammations in the extremities. As poultices produce their beneficial action by the emollient effect of the moisture they contain, they should be invariably kept wet. If allowed to dry, they ferment, and impede the radiation of the animal heat from the diseased part, so as to do absolute injury. In applying them to the extremities, care should be taken not to tie on the canvass or cloth in which they are wrapped so tightly as to obstruct the circulation, for in such cases, instead of assuaging the inflammation, they will increase it. Poultices of stale beer grounds, boiled carrots, or powdered charcoal, correct the fœtidness of foul, ichorous, discharging surfaces, as in grease, &c. Poultices wet with Goulard's extract frequently induce the production of healthy granulations in wounds and ulcers. Poultices into which a large portion of alum enters are of advantage in cracked heels.

PURGATIVES, *vide* CATHARTICS.

## QUASSIA.

Infusion of quassia forms an excellent tonic bitter drench, admissible whenever the administration of tonics is called for.

## QUITTOR

Is a fistulous ulceration, showing itself at or about the junction of the skin with the hoof. Sometimes it is brought on by injuries to the bottom of the foot, such as punctures, bruises, and wounds from flints, granite, &c., which giving rise to inflammation extending to suppuration, and no outlet being formed through the insensible and unabsorbable horn for the passage of the pus, it collects and forces its way upwards, discharging itself at the coronet. Occasionally, however, quittor results from direct injuries to the coronet, as treads, over-reaches, and abrasions. When the lesion is allowed to proceed without treatment, extensive separations of the wall of the foot from the sensible parts takes place; the side cartilages also become implicated in the inflammation set up, and not unfrequently the bones themselves are extensively diseased. In most cases it will be necessary to thin the sole, and examine well into the utility of making a dependent drain for the sanies and matter formed, more particularly if the injury has commenced from mechanical violence to the bottom of the foot, and matter is collected under the sole. Such portions of the sole as have lost their attachment to the living structures should be cut away, but I am no advocate for a rash and indiscriminate removal of the partially separated wall of the foot. As the inflamed parts swell, and are encompassed on all sides by hard horn, it is desirable to give as much relief as possible by thinning the sole, rasping the wall over the sinuses, and by constantly enveloping the foot in a large and moist poultice. Stimulants may be injected with a syringe into the pipes or sinuses, and retained there by closing the orifice with a pledget of lint. Consistent caustic substances may be introduced with eminent service: plugs of linen or flax, dipped in solutions of

the protochloride of mercury, and impregnated with melted wax, tar, or resin. A still better "coring out" medicament may be made by pounding a few raisins up with a few grains of the acetate of copper. Such compounds are introduced into the sinuses by a flexible blunt-pointed probe. When the diseased pipes are straight, and it can be conveniently done, the actual cautery may be used by preparing small cylindrical irons, adapted to the size of the sinuses, into which they are to be passed at a red heat. Such treatment will often save a great deal of trouble, and at the same time relieve the animal from a repetition of irritating caustic applications.

## RABIES, MADNESS, OR HYDROPHOBIA.

This dreadful disease has no spontaneous origin in the horse, but is invariably communicated to him by the virus contained in the saliva of carnivorous animals, such as bites from rabid dogs. Mr. Youatt says that it follows the innoculating bite at some period varying from three to eight weeks, while Mr. Blaine gives a longer range to the incubation of the rabid virus, and thinks that the time of its appearance is from five weeks to three months; but that its attack is always quickest when the bite is received in the head. I recollect a case that would appear to confirm this last assertion, for the horse was bitten in the lips, and after the lapse of twenty days the violent symptoms of rabies showed themselves. As is usually the case, the wounds having previously healed, again opened, and discharged a fluid excretion. Soon after the attack the animal is truly mad, he lashes about, destroying everything before him, covered with perspiration, and apparently unconscious of the injuries he is doing to himself by his frantic conduct. As the disease advances there is usually a paralysis of the hinder

extremities, and the melancholy scene is generally terminated by death, within twelve hours of its commencement. It is said that the saliva of a rabid horse will communicate the disease. The treatment of rabies must be prophylactic or preventive, for when once the symptoms are fully established, no cure is known. As soon as possible after the bite has been received, the wound should be washed with soap and water, the hair shaved off from the surrounding parts, and such portions as are punctured or lacerated may be carefully dissected away, so as to remove all contamination. Caustics or the hot iron may be afterwards applied to the surface of the wound. The nitrate of silver is most commonly employed, and is even preferred by Mr. Youatt (a good authority on the subject) to the actual cautery. With respect to the administration of internal medicine, there is no agent at present known upon which the least reliance can be placed.

### RAKING.

The process of removing the fœces impacted in the rectum by the hand is termed back-raking. It is of great service when constipation accompanies inflammatory attacks, and in such cases it should be always practised before the injection of clysters. Boys perform this operation with the greatest ease, as their hand is much easier admitted. It should be done slowly, and before commencing, the hand and arm ought to be oiled, in order to facilitate their introduction.

### RED COLIC: *vide* ENTERITIS.

### RESIN.

Resin is one of the most active agents on the list of diuretics. It produces its effects without deranging any other functions of the body, and may be administered almost under any circumstances. It is gene-

rally combined with assisting materials, such as nitre, soap, turpentine, juniper, &c.; but this is almost needless, for it acts well on the kidneys without any other substance to aid or correct its operation, and only requires some body to keep its particles in a divided state. The dose of resin is from three to eight drachms.

Resin enters into the composition of adhesive charges and of digestive ointments, for dressing wounds, setons, rowels, and other issues. For the latter purposes a good ointment may be made as follows: —

*Unguentum Resinæ*

| | |
|---|---|
| Resin, powdered - | - two pounds. |
| Yellow wax - - | - one pound. |
| Lard - - | - four pounds. |

Melt together at a low heat, and while hot strain through a coarse linen cloth.

## RINGBONE.

When exostosis extends itself around the pastern joint it is termed ringbone. It arises from concussion. Bony matter is deposited in the room of cartilaginous or ligamentous substance, often to the extent of completely obliterating or anchylosing the joint. When it has proceeded thus far, all treatment is useless; but prior to that event, during the progress of the inflammation, counter-irritation should be actively employed. Sweating-blisters repeated at short intervals, setons, and the actual cautery may be resorted to.

## ROARING.

Any obstruction to the free transit of the air through the respiratory passages will cause an unnatural noise. Such sounds, the result of a departure

from the healthy state, are, when more moderate, termed by the people of the stable, piping, wheezing, whistling, &c. Possibly the most frequent cause of roaring is a paralysis or even partial absorption of the small muscles opening and closing the glotis or entrance to the wind-pipe. This often arises from the use of the bearing-rein; from driving carriage horses always on the same side, so that the head and neck being twisted this portion of the trachea is thrown into and kept in an unnatural position, which, by being repeated from day to day, puts one set of muscles entirely out of use, and eventually produces the obstruction to the passage of the air which causes the noise. The long-legged, gaunt, carriage horses, so much patronised by George the Fourth, are exceedingly predisposed to this lesion. Thickening of the lining membrane of the larynx, membranous bands, the product of pre-existing inflammations, sometimes produce this imperfection. The prevalent custom of "coughing" horses, by pinching the laryngeal cartilages, may give rise to roaring, from the accession of inflammation followed by a deposition of lymph permanently thickening the investing membrane, and probably producing adhesions. As roaring is proved to be inheritable, roarers should never be bred from: some peculiarity of formation existing in the parent may be transmitted to the offspring and reproduce the same defect, or at least predispose to its reproduction. The treatment of roaring must accord with the supposed cause. Mr. Sewell's plan in such cases as are supposed to arise from the bearing-rein, is to keep the animal tied up, with his head elevated. If there be reason to suspect that irritation is still going on, setons may be introduced near the part affected; and should there be evidence of the presence of higher inflammatory action, blood may be abstracted, and subsequently, sweating blisters rubbed in over the throat.

## ROWELS.

These issues act by producing a counter or opposing irritation in the subcutaneous cellular membrane, that they may detract the inflammatory action from a more vital or important organ to the unimportant part in which they are introduced. A pathological law appears to rule all inflammatory processes, and establishes that no two extensive inflammations shall exist simultaneously. Thus in deep-seated inflammations, the swelling of a rowel and the rising of a blister is regarded, and with good reason, as a favourable appearance, while their inactivity proclaims the unimpeded progress of the internal disease. Rowels are commonly made of a circular piece of leather, having a hole in the centre and wrapped round with tow. They are introduced, after making an incision through the skin, by scissors constructed for the purpose, and separating a portion of the integument from its attachments. They should be dressed daily as soon as a discharge is established.

## SANDCRACK.

This is a division of the horn of the hoof in the course of its fibres. It almost invariably makes its appearance on the inside quarter of the fore-feet, by reason of the less strength of the inner portion of the hoof. In the hind-feet the crack is sometimes seen at the toe. Sandcrack in the fore-feet is generally caused by an unnatural elevation of the toe, great stress taking place at the point of fracture during the exertions of the animal. Sometimes they originate from treads or injuries at the coronet to the frog-band, so that the secretions of the hoof being impeded, the part grows down in an imperfect manner. Some feet seem, from an inherent brittleness of horn, to be parti-

cularly liable to sandcrack. This defect is a source of unsoundness, as it is always liable to prevent the horse from performing his proper duties. The general plan of treating sandcrack, is to separate the divided from the growing portion of the horn by a rasp or a firing-iron, and then (should inflammation be absent from the crack) to seal it up with pitchy substances, at the same time relieving the part immediately beneath from the pressure of the shoe by chambering it out. To prevent a recurrence of the disjunction before the growth of horn from above downwards is completed, Mr. Blaine recommends us to "melt some shoe-maker's wax, and smear all over the hoof; and before it is quite cold, bind upon the wax, neatly, evenly, and firmly, about three yards of tape, so as to include as much of the hoof as may be within the turns: fasten off with a hard knot, and again over the whole smear more wax, and lastly smooth it into an even surface. After all, rub over a little lard or other greasy substance, to prevent the pitchy matter from sticking." *

SEDATIVES: *vide* NARCOTICS.

SETONS.

Setons are employed with the same view as firing, blisters, and rowels,—that of producing a counteracting inflammation; but setons can be used in situations and under circumstances in which the others are inadmissible. They are generally composed of a piece of coarse tape, occasionally smeared with some stimulating unguent, introduced beneath the skin by a strong flat needle, and secured there by the ends being tied into large knots. Setons are much more employed by our continental neighbours than by

* Outlines of the Veterinary Art, p. 562.

ourselves, although Mr. Sewell has been the means of rendering them more fashionable than they hitherto were. They do not blemish so much as firing or rowels, and they can be applied in a greater variety of instances. Setons are advantageously introduced as a means of obtaining a depending orifice in poll-evil, fistulous withers, and other ulcerative processes, where the matter, by its gravity, burrows downwards. In inflammatory disease, and in chronic enlargement of the joints, thecas, capsules, bursæ, ligaments, &c., they are equally applicable and serviceable. By some practitioners they are introduced within the eye-lid in ophthalmia and opacity of the cornea, but their utility in that position is very questionable. Setons are passed through the substance of the frog in disease of the navicular joint. To derive all the possible benefit from setons, they should be moved daily and kept clean and dressed with the common resin ointment.*

SILVER.—*Nitrate of Silver* (*Lunar Caustic.*)

This is a powerful caustic and escharotic. It is frequently used to excite a new action in unhealthy wounds, and in ulcers, cankers, and quittors. Under some circumstances its employment externally to the skin is attended with benefit, for when diluted with lard it forms a good stimulant in ossified cartilages, incipient spavins and splints, and appears to promote the activity of the absorbents.

SPANISH FLY: *vide* CANTHARIDES.

SPAVINS.

This term is derived from a synonymous French word *esparvin*. Considerable discrepancy exists among

* Ung. Resinæ, p. 343.

veterinarians as to the exact original seat of spavin, but I select Mr. Percivall's, as it conforms with my own opinion. He regards it as an exostosis "upon or near to the inner and lower part of the hock. In its origin and progress it is very similar to a splint; indeed, it may be, in reality, purely a splint, although, from its situation, we denominate it a spavin. To explain this, a spavin may, and commonly, we believe, does arise from an inflammation of the cartilago-ligamentous substance connecting the head of the inner small metatarsal to that of the canon-bone, without any accompanying disease of the bones of the hock; and this, terminating in ossification, may be a splint as to its nature, but is a spavin as to its situation. If, however, the inflammation extends from this cartilago-ligamentous substance to the ligaments and bones of the hock, and terminates there in the effusion of bony matter; or if the exostosis of the inner metacarpal bone itself is so placed as to disturb the motions of the joint, then does a spavin differ from a splent." Young horses are most subject to splents, old ones to spavins. Spavin, in all its forms and stages, constitutes unsoundness. The lameness is often great, and most commonly permanent. Spavined horses exhibit a disinclination to lie down, from an instinctive perception of the difficulty and pain in rising again. Spavins are caused by long-continued exertion, and by sudden strains in leaping, drawing, or galloping. When the presence of spavin is suspected, from slight lameness behind, with an enlargement and increased temperature of the joint at the spavin place (the inner and lower part of the hock), and from evident stiffness of the joint itself, the animal should be placed in a state of complete rest, and every means taken to subdue, by timely appliances, the further progress of the ossification. For this purpose counter-irritation, in all its varied forms, is to be had recourse to. Stimulating lotions,

blisters, repeated again and again, and firing the integuments over the immediate seat of the disease and around the hock. Considerable dependence is properly placed by some on the seton, as a means of deflecting the inflammation from its seat without the liability of increasing the general vascular action of the joint, which might be effected by the irritation set up by blistering and firing. On rest and the seton, therefore, will our principal dependence be placed in attempting to restore the joint to a state approaching that of health. The chance of success will be ruled by the length of time the evil has been present, and by the extent of the exostosis. We may be able to subdue the inflammation and remove the lameness, but it is impossible to restore completely the primitive flexibility of the joint. When remedied so far as to render the horse serviceable, it is judicious, in order that a recurrence of the lameness may not take place, to place the animal to less violent and slower work; as by such a course his utility may be prolonged to an undetermined period.

## SPLENTS OR SPLINTS.

The small metacarpal bones are united to the shank or canon bone by a fibro-ligamentous substance, which being over-worked, inflames, and is transmuted, by a natural process, into bone, so that the three bones are completely cemented together. But when the ossifying process is set up it rarely confines itself to the attaching ligament alluded to, but throws out on one or both sides of the metacarpals small bony deposits, which, by distending the periosteum, or membrane immediately investing the bones, gives rise to inflammation and pain, and sometimes to lameness.

Besides pressing on the inelastic periosteum, splints frequently interfere with the action of the tendons and ligaments of the leg, and in this manner produce considerable additional evil. When they are thrown out high up the leg, they are liable to implicate some of the ligaments of the knee-joint, and when appearing on the inside of the metacarpals, they may obstruct the free action of the flexor tendons. When a large splint arises on the inner surface of the leg, it forms a prominence that is very likely to be struck by the opposite foot when the animal is in motion, and so cause additional pain and inflammation. Splints appear mostly in young horses; it being frequently observed that when the animal becomes old, they are absorbed, and disappear of themselves. They are not necessarily a cause of unsoundness, as many of the most valuable and serviceable horses have splints, and yet work well and soundly, without the least impediment from them: however, if a horse be found lame from a splint, or its size or position be such as to call up reasonable suspicions detrimental to his utility, it will be the veterinarian's duty to point out the injurious tendency of the defect, and to reject, as liable to become less serviceable from the lesion at some future day. The treatment of splints at present differs from the olden practice of removing them by the mechanical aid of mallet and chisel. When distension of the periosteum is the source of pain and lameness in the incipient, growing, splint, Mr. Sewell's elegant, scientific, simple, and short operation (though fearfully christened) is worthy of general adoption. Subcutaneous periosteotomy, as Mr. S. terms it, is easily performed; and I have seen many instances in which its effect of removing the lameness has been instantaneous and permanent. It consists in making a small opening through the skin above or below the splint, and introducing a narrow blunt-pointed bistoury to

cut through the periosteum on the most prominent part of the bony enlargement. This operation, by destroying the tension on the periosteum, relieves from pain, but does not in the least diminish the bulk of the splint. Pressure, by means of leaden compresses, is sometimes resorted to, to promote the removal of splints. The rationale of the action of pressure in removing bony or other morbid enlargements is, not that it increases absorption but that it diminishes deposition; it allows absorption to proceed as usual, but stops secretion: nearly for the same reason that we see these diseased deposits voluntarily removed in old age when the assimilative powers are ebbing and do not keep pace with the full demands of the animal economy. Setons, vesicants, and, in bad cases, where the ligaments are involved by the irritation set up, deep punctures are made into the part with a pointed firing iron.

## STAGGERS.

This is the farriers' term for inflammation of the brain. Properly, it is divided into two distinct varieties:—that arising of its own accord from direct inflammation of the encephalon (idiopathic phrenitis), and that springing from disorganisation of the digestive organs (symptomatic phrenitis, or stomach staggers). Neither forms are very common; and do not, therefore, require a lengthened description in a brief work of this nature. In 1785-6, this disease raged with great violence among the farm-horses of the midland counties. Scarcely any of the agriculturists of that district escaped without serious loss. Many lost six, eight, or nine of their best waggon-horses. It appeared to be a modification of stomach staggers, and was attended with a violent fever and

delirium. In both varieties of the disease there is evident cerebral disturbance; at first drowsiness, lethargy, drooping or resting the head, dilated pupil, and injected conjunctiva; afterwards, the pulse and breathing become much elevated. In idiopathic staggers, these symptoms pass rapidly on to exhibitions of phrensy. The horse is truly delirious, and it is dangerous to come near him. He passes small quantities of offensive urine, and hard, dry fæces. Large quantities of blood must be abstracted, and every attempt made by the administration of powerful cathartic medicine to act on the bowels. In stomach staggers, the phrenitic symptoms are generally more moderate. The cause is mechanical distension of the stomach with unmasticated or indigestible food. Blood may be taken from the strong, and stimulants given to rouse the dormant powers of the stomach. If gas be present in that organ by the fermentation of the ingesta, vinegar is a useful remedy. These medicines may be followed by aloetic drenches, in order to carry the crudities through the alimentary canal. Clysters may be thrown up, and vesicating embrocations applied to the flanks and sides.

### STARCH.

Starch drenches are occasionally used in diarrhœa, or a solution of starch is administered, *per anum*, in clysters.

### STRANGLES.

In all probability, this term originated from the difficulty of deglutition, which frequently accompanies the affection. It shows itself in young horses, and is regarded by some as a specific or constitutional disease,

to which all must submit, and, when an animal has once passed its ordeal, a fear of its recurrence need not be anticipated. The access of this disease is marked by circulatory derangement, the pulse being slightly exalted, accompanied with exhibitions of symptomatic fever, cough, and sore throat. The parts around the throat swell, and there is tenderness about the submaxillary glands, which sometimes extends to the parotids. The animal refuses to drink, and seldom eats his rations of food. There is a flow of saliva from the mouth, and of a semi-purulent discharge from the nose. Occasionally the lungs participate in the inflammation set up, and the breathing becomes more hurried. *Treatment.* — Bleeding must only be resorted to in strangles, when the lungs have fallen under the disease, or other highly inflammatory appearances present themselves. Sometimes, by acting revulsively, it tends to prolong the attack, or reduces the strength of the animal so much, that the affection lapses into farcy or glanders. Steaming mashes are appended to the head, and the skin covering the glands between the jaw stimulated or blistered to promote suppuration. As soon as fluctuation of the matter is very perceptible, an opening may be made at the part which points, and the pus evacuated. A pledget of tow should then be introduced into the orifice, to keep the abscess open for a few days. Gentle walking exercise will tend much to restore the strength of the animal. Green food, from its succulence and easy mastication, is most preferable in strangles. When the symptoms have relaxed, and the appetite returns, plenty of nourishment should be supplied; and if the debility which generally follows the disease be great, malt mashes and tonic medicine will be found beneficial.

### SPRING-HALT, OR STRING-HALT.

Termed in some parts of Scotland click-spavin. This is more a species of defective action than a disease. It essentially consists of a spasmodic contraction of the flexor muscles of the legs, by which the extremities are caught up in a rapid and unnatural way. It is seen most often in the hinder legs, but sometimes it shows itself in those before. Opinion is divided as to the exact seat or cause of this lesion, some contending that it arises from irregularity of nervous supply, or of disease of the nerves themselves, and others viewing it as originating from a loss of the balancing or antagonistic power resident in those muscles that are grouped in opposition regulate each other's action. No course of treatment has yet been promulgated by which this unsightly defect can be removed. This affection is very common, but seems to impede but slightly the progressive movements of the animal. The chestnut race-horse Guildford possessed it in a remarkable degree in both hind legs, but yet the horse was not withdrawn from the turf in consequence. It shows itself most at the commencement of exertion, usually disappearing as the animal grows warm at his work.

SULPHATE OF COPPER: *vide* COPPER.

SULPHATE OF IRON: *vide* IRON.

SULPHATE OF LEAD: *vide* LEAD.

SULPHATE OF ZINC: *vide* ZINC.

### SULPHUR.

Internally prescribed, sulphur acts with decided effect as an alterative. It improves the condition

and appearance of the coat, and, combined with antimonial preparations, is particularly useful in hide-bound, scurfy states of the skin, in mange and surfeit. When given alone, in large doses, it operates as an aperient. Externally it is employed as an adjunct in mange mixtures.

### TAR.

This substance is sometimes given internally in coughs, but its most common application is externally. Tar enters largely into stoppings for diseased feet, forming, for that purpose, a good stimulating, penetrating ingredient. When tar is diluted with equal parts of oil it forms a dressing much used for the hoofs; but I think, in this case, it is misapplied, for its action is to prevent the absorption of moisture, and thus tend to increase instead of diminishing the brittleness of the horn. An excellent liniment may be compounded by melting two parts of tar and two parts of cocoa-nut oil with one part of yellow wax. This may be used with advantage as a mange dressing, and as a detergent in most descriptions of scabby, eruptive skin affections. It should be rubbed in with a rather stiff brush or a piece of hair-cloth, and it will be found less objectionable, and fully as effective, as any other more vaunted compound.

### TETANUS, OR LOCKED-JAW.

Tetanus is essentially a disorder of the nervous system. It would appear that the motor nerves participate most deeply in the morbid irritation and excitability of which these organs are susceptible. The disease first shows itself by a contraction or continued stiffness of the voluntary muscles about the

throat and jaws, until the jaws become immovably fixed or locked. The muscles of the eye so retract it as to produce a permanent squint, and throw the haw partially over it. All the muscles of the neck, trunk, and extremities appear rigidly contracted. The tail is cocked, and the ears erect and set pointing forward. Profuse sweats cover the body, and the pulse and breathing become unnaturally excited; if no favourable turn take place, the suffering and deprivation of food wear the animal out in a few days. The most common cause of tetanus is the repulsive action of cold, either applied suddenly while the horse is sweating from exertion, or more slowly by the continuance of evaporation of moisture from the skin. Again, it often arises from wounds, particularly when in the feet, and from such operations as docking and castration. Worms in the intestines will occasionally produce tetanus. Locked-jaw is generally a fatal disease. If it arise from wounds or injuries, it is usual to attempt a removal of the irritation by anodyne fomentations, freely laying the parts open, dividing the nerve above the injury, or to excite a new inflammation by stimulation. If from docking, a re-performance of the operation is recommended. When it originates from other causes, an antiphlogistic plan of treatment is generally followed. Large quantities of blood are abstracted, and after the bowels are opened, the most powerful sedatives are given. As it is extremely difficult to administer bulky medicines, those of condensed activity are selected. The purgative most generally employed is croton-oil, and the sedative a strong solution of opium. Blistering along the whole course of the spine is sometimes found serviceable. Some practitioners recommend covering the body with fresh sheep-skins, and confining the patient to a warm atmosphere; while again, others pursue an opposite course, and dash large quantities of cold water over his body, — possibly on the prin-

ciple of "similia similibus curentur." If by any of these means the jaws can be but partially opened, so that the attendants can introduce a small pipe into the mouth and administer fluid nourishment, there are good hopes of recovery. Nourishing clysters may be thrown up, and if practicable the stomach-pump may be used, to convey gruel directly into the stomach.

### THOROUGH-PIN.

This is merely a bursal enlargement of the hock, showing itself on both sides of the joint—hence its name. It is most common in draught-horses, but seldom interferes much with their utility. Its treatment is similar to that of windgalls and other enlarged bursæ.

### THRUSH, OR FRUSH.

Is a diseased action of the sensible frog, resulting from inflammation, in which it secretes and discharges a fœtid, semi-purulent fluid. The cleft of the frog is almost invariably the primitive seat of the disease. Thrushes are sometimes produced by the heat and foulness of the stable, but most commonly contraction of the foot is its cause. Thrushes are supposed to act as a drain of morbid matter from the system, and obviate other affections, so that suddenly checking them is not always unattended with derangement of some other organ. Neglected thrushes often degenerate into canker. Horses with thrushes are always tender-footed, and should a stone happen to press on the affected frog they go very limping for a few steps; otherwise thrushes do not generally materially impede the usefulness of the animal; but yet it must not be forgotten, that their presence usually marks the com-

mencement or advance of contraction. *Treatment.*—If the thrush or thrushes occur in open feet from the decomposing fermentation of foul litter, the simple course will be to prevent a continuance of the exciting circumstances, acting solely on the medical axiom, sublatâ causâ, tollitur effectus. When contraction is the cause, our attempts should be equally directed to a removal of the producing agent, but at the same time medical astringents may be serviceably applied to the parts. A pledget of tow, or other similar substance, previously soaked in a mixture of tar and dilute sulphuric acid, or of tar and either the sulphate of copper, alumina, or zinc, powdered, and introduced into the cleft of the frog with a blunt spatula, and allowed to remain, while the more exposed parts of the frog should be brushed over with some of the same compound. Almost any of the mineral astringents will operate to check the progress of thrushes. Should the disease have extended itself to other portions of the frog, regular stoppings of any stimulating mixture should be secured with compresses of tow and splints of wood, the dressings being renewed every day, or at furthest every alternate day.

### TOBACCO.

Tobacco is powerfully narcotic when given internally, but the proper means of availing ourselves of this valuable property is not yet understood. Tobacco enemas are of eminent service in obstinate constipations of the bowels, and in tetanus and some other spasmodic affections. Allusion has been made at p. 279., to the Arab method of employing this agent in gripes. Infusions of tobacco enter largely into mange mixtures, and are also destructive of parasitic insects.

## TONICS.

The list of veterinary tonics is rather long. Among those selected from the mineral world are the carbonate, the sulphate, and the ioduret of iron; arsenious acid; and the sulphates of copper and zinc. From the vegetable kingdom are taken the different varieties of bark, chyryata, gentian, quassia, ginger, cayenne, pepper, and carraway seeds; and from the insect tribes is derived one of the most valuable tonics—cantharides. The particular action of each article in the above list will be found detailed under its name. A few examples of the method of combining these materials into tonic masses will suffice.

*Tonic Balls.*

No. 1. Subcarbonate of iron - - four parts.
Gentian root - - - two parts.
Ginger - - - one part.
Meal - - - - one part.

Made into balls with treacle. Dose — an ounce of the mass.

No. 2. Sulphate of iron - - three parts.
Chyryata - - - one part.
Meal - - - - one part.

No. 3. Ginger - - - two parts.
Bruised carraways - - one part.
Meal - - - - five parts.
Cantharides, in the proportion of three grains to each ball.

No. 4. Cascarilla - - - two parts.
Quassia - - - two parts.
Gentian - - - two parts.
Cayenne pepper - - two parts.

Made into balls, as the first example. Dose, about 1 oz.

A useful tonic and carminative draught may be made by infusing two ounces of camomile flowers, and the same quantity of aniseed, in a quart of water, and, after straining, to add two ounces of sulphuric ether. This quantity is sufficient for two doses.

## TRACHEOTOMY.

It is sometimes necessary to make an artificial opening into the windpipe. Occasionally, in strangles, the upper passage for the air becomes obstructed; the same takes place in some cases of roaring; in such instances, that the animal may be able to breathe, it is necessary to make a fresh passage for the air. A case occurred to me, in which I was compelled to perform it, in order to maintain the life of the animal. The horse had a large and increasing polypous tumour in the nasal cavities, almost entirely intercepting the passage of the air. The trachea was opened, in order that respiration might be carried on during the removal of the enlargement. Mr. Blaine mentions a distressing case of a gunpowder explosion, which so tumefied the horse's nose as to prevent free inspiration, and render the operation of tracheotomy imperative. The operation is thus accomplished:— The horse is cast, and an incision made through the integuments in the course of the trachea; these flaps being held back, a portion of one of the rings of the windpipe is cut away, so as to allow the admission of a pewter pipe, constructed for the purpose, and secured to the neck by tapes. Through this pipe the animal breathes, and it will be therefore necessary to inspect it once or twice a day, to see that it does not clog up with inspissated matter, and thus endanger the life of the animal.

### TURPENTINE.

The common semifluid turpentine is one of the best diuretics that we possess. Its dose is about half an ounce. It also enters into the composition of digestive ointments. Of the oil of turpentine, still larger quantities are used in horse medicine. In gripes, it forms an excellent antispasmodic, in three-drachm doses. It is also said to possess vermifuge qualities; but, in this respect, its action is not so decisive as on the human patient. It is often employed as an external stimulant, but, in all cases of inflammatory disease, its action, though prompt, is too irritative to allow of its being applied to the skin—the exciting effect on the system more than balancing the counter-irritation it sets up.

VERDIGRIS: *vide* COPPER.

### VERMIFUGES.

Those agents which assist in expelling worms from the intestines are termed vermifuges. Of these, the most commonly employed are calomel, lime-water, aloes, and linseed-oil. A dose of calomel, given overnight, followed by a moderate aloetic purge in the morning, will often expel large quantities of these intestinal parasites. A lime-water drench is a harmless and efficacious means of destroying them. A pint of linseed-oil on an empty stomach is, perhaps, the most certain vermifuge on the list. Arsenic is sometimes employed for this purpose, but I cannot speak as to its effects. (*Vide* WORMS.)

VINEGAR: *vide* ACIDS.

### WARTS.

Warts often exist in large quantities on some horses, and are a constant source of annoyance to them. The quickest method of removing them is to dissect them out with a sharp scalpel, and apply a small budding-iron to stanch the bleeding. A paste of lard and arsenic is a useful caustic application for destroying warts. The chloride of antimony is also used for this purpose by some practitioners. Mr. Blaine advises a daily dressing of

| | |
|---|---|
| Muriate [chloride] of antimony | two drachms. |
| Powdered savin | one ounce. |
| Lard | an ounce and a half. |

### WINDGALLS.

When the tendinous continuations of muscles pass over bony prominences or joints, across ligaments, or in close connection with each other, their points of contact are surrounded by a synovial sac, secreting a glairy fluid, to prevent friction. From continued and excessive exertion these sacs, or *bursæ mucosæ*, become enlarged by the distension of an over-secretion of the fluid. Such enlarged capsules are termed windgalls by farriers, and bursæ mucosæ by the medical profession; but neither term is correct, for they neither contain *wind*, nor are they *mucous* bags. These enlargements are most common about the joints, particularly the fetlock, to which the term windgalls is distinctively applied, others being named according to some peculiarity of form or situation. These swellings are seldom the cause of much suffering to the animal. They are generally slow, chronic, painless enlargements,—the standing record of hard work. They

are partially removed by the pressure of bandages, by stimulating liniments to the skin, by blisters, firing, and other such means as tend to promote the absorption of their contents. Of all these means, bandages are the least objectionable, and the most effective. If a thin, coarse, canvass roller be applied, with compresses on the enlarged sacs, and kept constantly wetted with cold water, or an evaporating lotion, we exert the combined action of pressure and cold on the absorbents. The old practitioners were often in the habit of opening these bags and evacuating their contents, but their example is now seldom followed, for there is nearly as much irritation and danger from laying them open as in perforating a joint itself.

## WORMS.

Among the entozoa or intestinal worms common to the horse are the *Ascaris lumbricoides*, a long round worm, often measuring a foot in length, principally inhabiting the intestines, but sometimes ascending to the stomach; the *Ascaris vermicularis*, or thread worm, about two inches long, frequenting the lower bowels; and the *Œstrus equus* or bot, hatched in the stomach. (*Vide* BOTS). When a horse has worms, our attention is usually attracted to the fact by observing a peculiar dry, yellowish, chalky matter adhering round the anus; his coat stares, and he looks unthrifty, from the sensitive sympathy existing between the intestines and skin; he rubs his tail against the stall-post, and frequently has a dry cough. Occasionally he is subject to repeated attacks of gripes. Intestinal worms are most frequently found in debilitated horses; they follow as a consequence of debility, which they serve also to increase. It should not be overlooked that many of the entozoa originate in the low stamina of the animal upon which they are parasites: as one

form of life lowers others commence, is an established law throughout the animate world. To prevent their access, therefore, we have only to keep our horses in good condition, and they will resist all parasitic attacks. Many medicinal agents are employed to detach worms from the primæ viæ. The filings of pewter, tin, or iron, are used as mechanical agents, but with little certainty. Purgatives act on them by augmenting the peristaltic action of the intestines, and by exciting an increased flow of mucus, so as to loosen their attachments and sweep them away. Bitters are generally destructive to the subordinate forms of life, and these worms are not entirely free from their action. Lime-water is a good vermifuge. Linseed oil, given fasting, will be also found highly efficacious in expelling both sorts of the ascaridæ. Turpentine, so valuable as a vermifuge in the human subject, is, for this purpose, nearly inert on the horse.

### ZINC (ZINCI).

Of this metal the sulphate is principally used. It possesses an astringent and tonic property, though seldom internally administered. Its chief use is in solution, as an external application, in diseases of the eye, to wounds, sores, and ulcers. As a collyrium in ophthalmia, Professor Morton recommends the use of the acetate of zinc in preference to the sulphate. This is readily formed for use, as he suggests, "by mixing a solution of the acetate of lead with the sulphate of zinc, when a double decomposition takes place, and two new salts are formed — a soluble acetate of zinc, and an insoluble sulphate of lead."

## TABULAR VIEW OF THE MOST COMMON DOSES OF THE AGENTS EMPLOYED INTERNALLY IN HORSE MEDICINE.

| *Substance.* | *Dose.* | *Action.* |
|---|---|---|
| Aloes, Barbadoes | six drachms | purgative. |
| —— Cape | eight drachms | purgative. |
| Alum | three drachms | astringent. |
| Ammoniæ carb. | two drachms | febrifuge. |
| Liq. ammon. acet. | six drachms | febrifuge. |
| Antim. sulph. | four drachms | alterative. |
| —— pot. tart. | one drachm | sedative. |
| Arsenic | one to ten grains | tonic. |
| Belladonna | two drachms | narcotic. |
| Camphor | one drachm | sedative, antispasmodic. |
| Cantharides | three grains | tonic. |
| Capsicum | one scruple | stomachic. |
| Carraway-seeds | six drachms | carminative. |
| Catechu | two drachms | astringent. |
| Chalk | one ounce | absorbent. |
| Chyryata | two drachms | bitter tonic. |
| Copper, acetate of | two drachms | tonic. |
| ——— sulphate of | half a drachm | tonic. |
| Croton oil | twenty drops | drastic purgative. |
| Digitalis | thirty grains | sedative. |
| Gentian | three drachms | bitter tonic. |
| Ginger | three drachms | cordial. |
| Hellebore (white) | twenty-five grs. | nauseant. |
| Iron, subcar. of | six drachms | tonic. |
| —— sulphate of | four drachms | tonic. |
| Lime water | two quarts | vermifuge. |
| Linseed oil | twelve ounces | cathartic. |
| Hyd. chlorid. | two drachms | laxative. |
| —— bi-chlorid. | ten grains | tonic alterant. |
| —— sulph. nig. | two drachms | alterative and vermif. |
| Myrrh | two drachms | tonic and astringent. |
| Nitre | three drachms | diuretic. |
| Opium | two drachms | sedative & antispasm. |
| Pimenta (tinct.) | four ounces | stimulant, antispasm. |
| Resin | four drachms | diuretic. |
| Turpentine | half an ounce | diuretic. |
| Oil of turpentine | three drachms | antispasmodic. |

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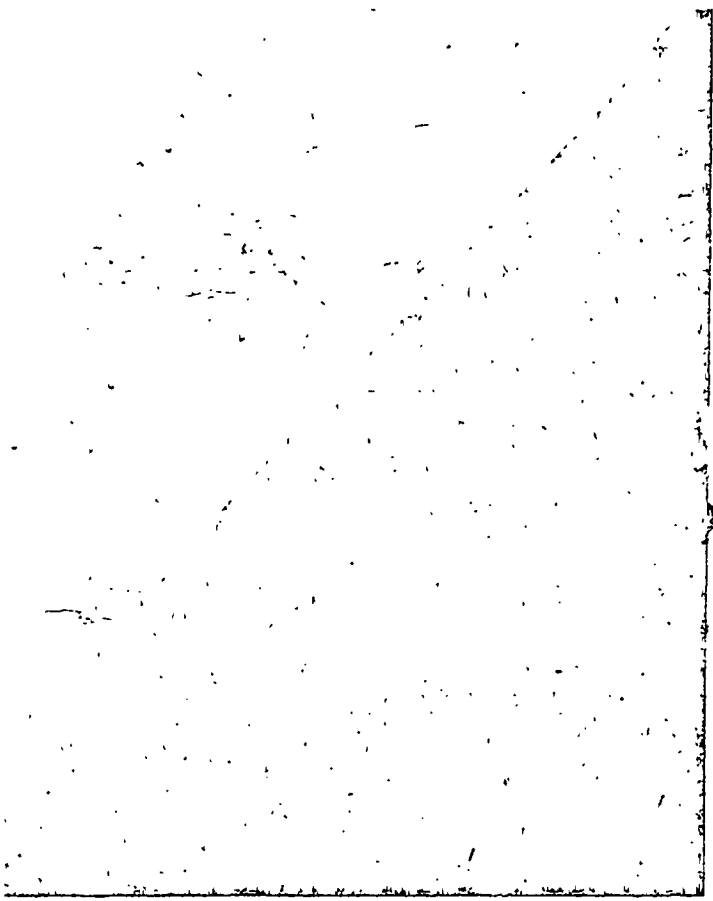

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